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Appendiceal Mass: Interval Appendectomy Should Not Be the Rule

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Abstract

Introduction: An appendiceal mass is the end result of a walled-off appendiceal perforation and occurs in 2 to 6 per cent of patients with appendicitis. Conservative treatment with intravenous antibiotics remains the standard approach. In the past, interval appendectomy was recommended to prevent repeated episodes of acute appendicitis which occurred in 10 to 20 per cent of patients mostly during the first year after the initial attack. Theoretically, routine elective interval appendectomy may be safely omitted in more than 80 per cent of patients.

Research design: Retrospective descriptive study.

Setting: University Hospital.

Patient selection: All patients clinically diagnosed with an appendiceal mass in Department of Surgery, Faculty of Medicine, King Chulalongkorn Memonal Hospital between January 1993 and December 1998.

Method: The medical records were reviewed case by case. The patients were classified into 2 groups. Appendectomy was performed in group 1. The patients who did not return for appendectomy (group 2) were asked for any symptoms suggesting recurrent appendicitis either by phone or by letter. The rate of recurrent appendicitis after initial conservative management is the main outcome.

Results: Appendiceal mass was diagnosed in 82 patients over the 6-year period in which the study was retrospectively reviewed. Their age ranged from 3 to 87 years (mean 37 years), the duration of symptoms ranged from 1 to 20 days (mean, 5.73 days). The diagnosis was confirmed by ultrasonography in 10 patients. Almost all patients received initial conservative management and scheduled for interval appendectomy. Interval appendectomy was performed in 43 patients, 5 of them (6.17%) had recurrence of symptoms before surgery. Immediate appendectomy without initial conservative treatment was done in one patient. The remaining 38 patients did not come back for appendectomy, 4 patients were lost to follow-up. No recurrent appendicitis was found in this group of patients.

Conclusion: Routine interval appendectomy is unnecessary in more than 80 per cent of patients. Appendectomy should be done only when the symptoms recur.

Acute appendicitis is the most common cause of an acute abdomen requiring surgery. An appendiceal mass is the end result of a walled-off appendiceal perforation and is found in 2 to 6 per cent of patients. Classically, following the successful conservative management with intravenous antibiotics, elective interval appendectomy was performed 6 to 12 weeks later.[1,2] However, several authors have questioned if interval appendectomy is necessary, as the recurrence is low (10 to 20 %).[2-7] Theoretically, routine elective interval appendectomy may be safely omitted in more than 80 per cent of patients.

Materials and Methods

All patients clinically diagnosed with appendiceal mass, treated in Department of Surgery, King Chulalongkorn Memorial Hospital between January 1993 and December 1998 were included in this study. The medical records of these patients were retrospectively reviewed.

Appendiceal mass was diagnosed if the patients gave a history of right lower quadrant pain, fever and palpable mass. Most patients were hospitalized and intravenous antibiotics, usually gentamicin plus metronidazole, were given until their symptoms subsided. All patients were scheduled for elective interval appendectomy 6 to 8 weeks after the intial hospital admission.

Patients who did not return for interval appendectomy were asked for any symptoms suggesting recurrent appendicits either by phone or by letters. The data collection ended on March 1999.

Results

Appendiceal mass was diagnosed in 82 patients over the 6-year period in which the study was retrospectively reviewed. The mean age was 37 years (range 3-87), male to female ratio was 1 to 1.38. The duration of symptoms ranged from 1 to 20 days (mean 5.73). The ultrasonography was performed to confirm diagnosis in 10 patients, 7 cases of phlegmon and 3 cases of abscess were identified.

Appendectomy was performed in 44 patients. Among these patients, immediate surgery without conservative treatment was performed in one patient. Five patients had recurrent abdominal pain and returned for surgery at 1, 3, 13, 13 and 40 weeks after the first admission. The rest of this group (38 patients) routine interval appendectomy was done without any symptoms indicating recurrent appendicitis before surgery. Wound infection developed in two patients (5.26%). The mean interval between the first symptoms of appendicitis and interval appendectomy was 16.7 weeks (range 6-40 weeks). The operative findings are shown in Table 1. Twenty-six specimens of appendix were sent for pathologic examination (Table 2).

Thirty-eight patients did not return to the hospital for interval appendectomy. Four patients were lost to follow-up and did not answer the questionnaire. No recurrent symptoms were found in the remaining of the patients (34 cases). Duration from the initial attack was 7 to 75 months (mean 27.38 months).

Barium enema was performed in 18 patients, most of the cases, after the symptoms subsided. The appendix was completely seen in 6 patients, partially seen in 6 and not filled in 4 patients. In two patients, caecal diverticulum was seen by barium enema.

Table 1 Intra-operative finding in patients undergoing interval appendectomy (38 patients).

Finding	No. of patients (%)
Adhesions	8 (21.05)
Inflammation	3 (7.89)
Normal	16 (42.11)
Atrophic appendix	11 (28.95)
Total	**38 (100.00)**

Table 2 Histological findings.

Finding	No. of patients (%)
Acute inflammation	1 (2.63)
Subacute inflammation	3 (7.89)
Chronic appendicitis	10 (26.32)
Fibrotic or obliterated lumen	10 (26.32)
Normal	2 (5.26)
Not examined	12 (27.58)
Total	**38 (100.00)**

Discussion

An appendiceal mass, either phlegmon or abscess, may occur in 2 to 6 per cent of patients with appendicitis.[1,8] Although the operative treatment of acute appendicitis is widely accepted, management of the condition complicated by a palpable mass has evoked controversy. In 1901, Oschner introduced an initial non-operative approach because of the fear that infection would be spread by early surgical intervention.

With the improvement of antibiotic therapy, some surgeons advocated immediate appendectomy and claimed that the procedure could be done safely and the readmission for interval appendectomy could be avoided.[1,2] But multiple reports noting a high morbidity rate with immediate appendectomy.[3,5] Recently, it was suggested that initial conservative treatment is the best way to treat appendiceal mass. If the mass and/or signs of infection persist, the diagnosis of an abscess is established and surgical intervention is indicated.

In this study, 81 patients were successfully treated with the conservative regimen. No surgical intervention was required during the first admission. One patient who did not receive conservative treatment before operation, had to stay in the hospital for 15 days due to postoperative gut obstruction.

The role of interval appendectomy is much more controversial. The main issues of this argument focus on the risk of recurrent appendicitis and missed pathological finding. From a review of literature, the reported frequency of recurrent appendicitis was found to be between 10 and 20 per cent.[2,4,5,7] Our recurrent rate of 6.17 per cent is lower than many reports and all of 5 patients had recurrent abdominal pain within one year after initial attack. If the others 4 patients who lost to follow-up had recurrent symptoms, the recurrent rate would become 11.11 per cent.

Among 38 patients who underwent interval appendectomy, we found macroscopically atrophic appendix in 11 patients (28.95%). Many surgeons believed that the risk of recurrence depending upon the patency of the appendiceal lumen. The histological finding also showed fibrotic or obliterated lumen in 10 specimens (26.32%). No malignancy was found in our patients.

Carcinoma of the caecum is rare in patients younger than 40 years while appendicitis become less common after the age of 40. Consequently, Most authors have recommended that all patients over the age of 40 to 50 years should undergo routine follow-up with barium enema or colonoscopy to exclude tumors of the colon after the resolution of the acute episode.[1-3,5,8-10] In our study, barium enema was performed in 18 only patients and caecal diverticulum was identified in 2 patients.

Conclusion

All patients presenting with an appendiceal mass should initially be treated conservatively. In the absence of rapid improvement, abdominal ultrasonography should be performed. When an abscess is demonstrated, percutaneous drainage is the treatment of choice while the open procedure may be required in complex multiloculated abscesses. Routine elective interval appendectomy is not recommended. However, patients over the age of 40 years should be followed with appropriate radiological studies or colonoscopy to exclude abdominal malignancy.

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Nontraumatic Perforation of the Small Intestine

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Abstract **Nontraumatic perforation of the small intestine is rarely encountered in acute surgical abdomen. A series of 16 patients admitted to Department of Surgery, Vajira Hospital from January 1989 to December 1998 was reviewed. Underlying conditions were typhoid ulcers. adhesions, radiation enteritis, SLE, neoplasia, tuberculosis, metastasis, and diverticula. Surgical resection and end-to-end anastomosis was the preferred procedure in order to gain histologic examination of the perforated bowel segment. One anastomosis leakage with spontaneous closure was observed. Two patients in this series died (12.5 %), one from tumor metastasis and the other from complication of radiation enteritis.**

Perforations of the gastrointestinal tract are common causes of peritonitis requiring immediate surgical therapy. Perforations not resulting from external trauma have been called spontaneous or nontraumatic perforations.[1-3] The sites most frequently encountered are in the stomach and duodenum, whereas the nontraumatic perforations of the small intestine distal to the duodenum are very rarely found in contries with high hygienic standards. On the other hand in regions with poorer hygienic conditions, perforations of the small intestine caused by typhoid ulcers, intestinal tuberculosis or parasitic disease have been well recognized.[4-6]

Because of the rarity of nontraumatic perforations of the small intestine, a surgeon is unlikely to have much experience with this disease. Thus, to gain more knowledge, we have collected and reviewed all the cases treated at Department of Surgery, Vajira Hospital during a 10 - year - period from January 1989 to December 1998.

Materials and Methods

Between January 1989 and December 1998, 16 patients with nontraumatic perforation of the small intestine were admitted to the Department of Surgery, Vajira Hospital, Bangkok. Six were female and 10 were male patients with the age ranging of 17 to 71 years. Details of clinical informations were summarized in Table 1. On admission, these patients had abdominal pain 5 hours up to 5 days duration. Four patients were observed with increased leukocytes up to 20,000 cells/cumm.

Ten patients showed free air on the abdominal radiograph. Lower abdominal tenderness, guarding and rigidity were frequent clinical findings. Signs of ileus on the abdominal radiograph could be seen in all patients. Only one of the patients with radiation enteritis can be accurately diagnosed preoperatively. The preoperative diagnoses in most instances included perforated appendicitis, peptic perforation and peritonitis.

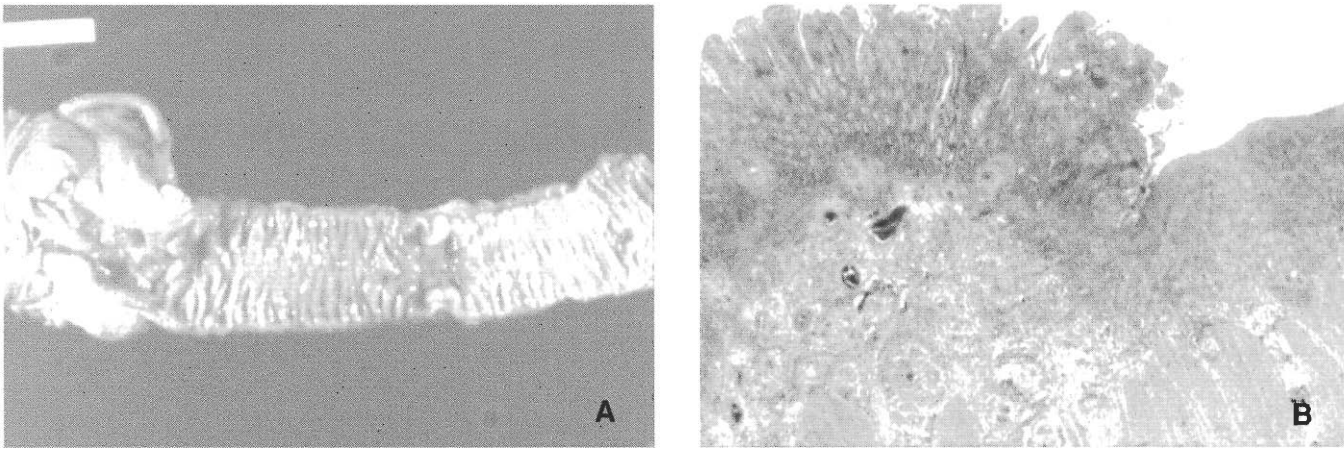

Fig. 1 A. Photograph of a surgical resected specimen of terminal ileum depicting an ulcer with perforation located about 21 cm from the ileocecal junction.
B. Photomicrograph of Tuberculous ulcer from lesion shown in (A) with caseous granulomas and positive acid fast bacilli

Results

Typhoid ulcer was found to be the cause of perforation in four patients. The site of perforation was at proximal jejunum (30 cms from ligament of Treitz) in one patient. In other cases, perforated bowel wall involved the terminal ileum (10 cms from ileocecal valve). All of them had a rising typhoid titer.

Intestinal obstruction caused the perforation in three cases. The adhesion bands caused a close-strangulated loop obstruction in two cases. Their perforations were located in the distal jejunum and proximal ileum. Hematoma of the ileal mesentery from unknown etiology caused small bowel obstruction in the last patient with the perforation also located in distal jejunum and proximal ileum.

Table 1 Causes, surgical therapy, and postoperative course in 16 patients with nontraumatic perforation of small intestine.

Age (yr) & Sex	Cause	Therapy	Postoperative course
25 M	Typhoid	Resection	Uncomplicated
20, M	Typhoid	Resection	Uncomplicated
45 F	Typhoid	Resection	Uncomplicated
62, M	Typhoid	Resection	Small bowel fistula
17, M	Idiopathic	Resection	Uncomplicated
63, F	Radiation enteritis	Resection	Death
35 M	Adhesion	Resection	Uncomplicated
71, F	Adhesion	Resection	Uncomplicated
42, M	Adhesion	Resection-oversewing	Re-perforation
21, F	SLE	Resection	Uncomplicated
55 F	Diverticula	Resection	Uncomplicated
68 F	Metastases	Resection	Death
42 M	Tuberculosis	Resection	Uncomplicated
28 M	Tuberculosis	Resection	Uncomplicated
42 M	Neoplasia	Resection	Uncomplicated
51 M	Neoplasia	Resection	Uncomplicated

Table 2 Causes of nontraumatic perforations of small bowel in other series compared with this study.

Cause	Huttunen[1]	Markowitz[7]	Rajagopalan[9]	Author
Foreign body	4	9	2	-
Primary Neoplasia	1	3	3	2
Adhesions	5	-	-	3
Diverticula	4	2	1	1
Crohn's disease	2	1	4	-
Metastases	-	1	-	1
Tuberculosis	1	1	-	2
Typhoid	-	-	-	4
Idiopathic	3	1	5	1
Other causes	4	3	1	2
Death	10 (42%)	9 (43%)	4 (25%)	2 (13%)
Total	**24**	**21**	**16**	**16**

Three cases of perforation were related to neoplasia and metastasis. Two cases had tuberculous ulcers with perforation at terminal ileum (Figure 1). A 63-year old female with stage IIB cancer of cervix previously treated with radiation had her terminal ileum injured and perforated. One case of small bowel perforation occurred in a patient with SLE who had been on long-term steroid medication. One patient had perforation at the site of a diverticulum. A 17-year-old boy had perforation at terminal ileum in which the cause could not be definitely determined.

Their postoperative courses were completely uneventful in 13 patients. Two patients died after the operation. Reperforation was found in one patient at previous oversewing site. Small bowel fistula after bowel resection and end-to-end anastomosis occurred in one patient with spontaneous closure after 2 weeks of total parenteral nutrition therapy.

Discussion

In our series of 16 cases, typhoid ulcers (4 cases, 25 %) was the most frequent cause of the perforation. Adhesions band was the second common cause (3 cases, 18.8 %). Several investigators[1,7-9] listed foreign body, primary neoplasia, adhesions, Crohn's disease, metastasis, tuberculosis and diverticula were among the recognized causes of non-traumatic perforation of small intestine. However, there were still a number of cases in which the cause of perforation could not be defined in all the series reported. Rajagopalan[9] used the term idiopathic perforation for those cases that the actual pathology that caused the perforation may not be disclosed intraoperatively or demonstrated by histologic study of the surgical specimens. Crohn's disease has been rarely encountered in Thailand and none was found as the cause of perforation in our series.

Potassium tablets (regular and slow-release form)[10-12] has been previously reported to be a possible cause of jejunal perforation consequent to local drug toxicity. Ingoldby[13] described a case of perforation in the upper jejunum after ingestion of slow release iron tablets but it was also found that the patient had several diverticula in his jejunum and the iron tablet happened to be trapped in one of the diverticula. In our one case listed as idiopathic perforation in the ileum did have a history of taking oral medication but a definitive correlation could not be established. One of our case took steroid for a long period of time for treatment of systemic lupus erythematosus (SLE). It was not clear to us that the cause of the perforation of jejunum might be caused by local drug reaction of steroid or by the vasculitis involved in SLE.[14,15]

Most of our 16 cases received resection of the perforated segment of the intestine at surgical exploration. Despite the present of severe local peritonitis, we experienced anastomotic leakage in only one case. Resection and end-to-end anastomosis was a safe procedure and did not require any longer operative time.[2] We prefer segmental resection over excision and oversewing of the perforation because of less compli-

cation and also to have sufficient tissue for histologic examination to elucidate the possible etiology of the perforation.

Nadkarni[3] advocated exteriorization of the affected intestine after excision and oversewing of the perforation in the situation of a rural country where patients usually came to hospital late due to problems of transportation. Such approach may be life saving and the exteriorized intestinal segment could be safely returned into the peritoneal cavity subsequently. We would regard this procedure as justifiable only for the cases with severe and late peritonitis.

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Morphological Stability of Fat Particles in All-in-one Parenteral Nutrition

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Abstract *Background* "All-in-one" parenteral nutrition is an accepted method of nutritional support in surgical patients. However, controversy still exists in the stability of fat emulsions, when mixed with other nutritional components and hang for a period of infusion. The general consensus is that particle larger than 5 microns should not be administered, since particle larger than 6 microns increase the risk of fat embolism and may be associated with hemodynamic changes. A study was conducted to evaluate the physical stability of fat particles in parenteral nutrition systems currently practiced in pediatric surgical intensive care unit, Siriraj Hospital, to ensure that it is safe for clinical use.

Material and methods Seven admixtures of all-in-one parenteral nutrition, actually given for patients in pediatric surgical ICU, were examined under a transmission electron microscope. Each admixture contained glucose (10.47 - 11g/dl), amino acid (0.7 - 2.0 g/dl), 20% Intralipid, electrolytes and vitamins in a specific amount tailored for one day infusion of an individual patient. Specimens were collected from hanging bottles at immediately, six and twenty-for hours after mixing. The data were analyzed regarding the average sizes of fat particles, amount of large particles per counting area and maximum particle diameters (D-max). Comparisons were made between pure 20 % Intralipid and mixed emulsion. Statistical analysis was evaluated by Student's t-test.

Results Microscopic evidence of instability, such as coalescence was not detected in all samples. Average diameters of fat particles in 20 % Intralipid was 0.418 ± 0.144 microns, whereas particles in admixtures range in size between 0.341 ± 0.152 and 0.595 ± 0.283 microns. The average particle diameter in four of seven immediate samples was significantly larger than particle sizes in pure emulsion. Five admixtures had increased mean particle sizes at the twenty-forth hour post mixing, compared to the immediate solution. At 0, 6th and 24th hour post-mixing, large size (over than 4 microns) were found 0, 0.14 and 0.29 particles per counting area, respectively. No particle larger than 5 microns was detected in all specimens. Maximum diameter of particles (D-max) in pure 20% Intralipid was 1.74 microns whereas D-max in all admixture ranged from 1.3 to 4.65 microns (average 2.50 microns). Average D-max of twenty-forth-hour solution (2.62 microns) are not significantly larger than those of immediate sample (2.01 microns).

Conclusion Fat particles change their morphology slightly,when mixed in an all-in-one system and hang in room temperature for twenty-four hours. However, stability is still in the acceptable range within one day of infusion.

Parenteral nutrition (PN) has become an essential part of pre and post operative care in pediatric surgery. All-in-one parenteral nutrition system is one administration technique in which lipid emulsion is combined together with conventional solution of glucose, amino acids electrolytes and trace minerals in a single container for direct infusion.[1] This method is becoming more widely accepted because of its convenience, by eliminating the need of pumps and joint connectors, thus reducing overall cost and risk of infections.[2,3] Above all, this technique can provide a high caloric dense solution in low osmolality. Therefore, giving complete parenteral nutrition via peripheral veins is, therefore, possible.[1,4] Although complications are uncommon, there remains controversy regarding the stability of fat emulsions when mixed with other components. There is in-vitro evidence that, under inappropriate conditions, fat particles fuse together, forming large particles. Particles larger than 6 microns may cause pulmonary complications or hemodynamic change.[4,5]

The physical stability of fat particles in all-in-one parenteral nutrition, currently practiced in a pediatric surgical intensive care unit was then investigated, to ensure clinical safety.

Materials & Methods

Seven admixtures of all-in-one PN, which were given to patients in the pediatric surgical intensive care unit, Siriraj Hospital were examined by gross visual observation and microscopic examination by transmission electron microscope. Each PN formula was tailored daily for an individual patient, taking into account the patient's weight, clinical conditions and serum electrolytes.

The characteristics of each admixture are listed in Table 1. Glucose concentrations range from 10.47 to 10.89 gram-percent whereas amino acids (10% amino acid N pad, Frezenius, Germany) 1.3 to 2.0 gram-percent. Lipid emulsions consist of soy bean emulsion (20% Intralipid, Kabi Pharmacia AB, Stockholm, Sweden) in amounts of 2-4 grams per one kilogram of patient weight. Solutions were routinely mixed at the ward in the morning, just before infusion. Admixtures were hang at 25°C room temperature during twenty four hours of administration. Gross morphological observation was practiced as standard nursing care throughout the administration period.

Microscopic study was done using electron microscopic technique. Three samples from each admix-

Table I Characteristics of all-in-one parenteral nutrition in the study

Solution no.	1	2	3	4	5	6	7
Total volume (ml)	1528	397.5	413	910	395	368	8285
Dextrose (g%)	10.47	10.82	10.89	10.73	10.89	10.81	10.74
10%aminoacid N pad (g%)	1.3	2.01	1.57	1.9	1.52	1.61	1.45
20%Intralipid (ml/L)	98.2	113.2	96.9	122.3	113.9	161	121
Sodium (mEq/L)	39	42.4	21.8	24.5	22.8	75.4	29
Potassium (mEq/L)	18.3	45	9.7	10.9	15.2	30.2	19.3
Chloride (mEq/L)	39	22.6	21.8	24.5	22.8	75.4	29
Acetate (mEq/L)	24.9	35.2	19.4	21.7	25.3	34.2	24.1
Phosphate (mmol/L)	3.3	5	4.8	5.4	5.1	2	4.8
Calcium (mmol/L)	1.6	3.8	3.6	4.1	4.4	2.5	3.6
Magnesium (mEq/L)	2.6	5	4.8	5.4	5	4	2.4
Addamel (a) (ml)	2	1	0.5	0.5	0.5	2	2
Vitamins (b) (ml)	6	5	5	5	5	4	4
Osmolality (mOsm/Kg)	776	820	765	928	882	1075	945

a Addamel-N (Pharmacia AB, Stockholm, Sweden)

b Vitamins; consist of 1 ml of Vitamin K plus 2 - 4 ml of OMVI (Otsuka Pharmaceutical, Tokyo, Japan) (Case#1,6,7) or 1ml of Vitamin K plus 2 ml of Vitalipid (Pharmacia & Upjohn AB,Stockholm, Sweden) and 2 ml of Soluvit N (Kabi Pharmacia AB, Stockholm, Sweden) (Case #2- 5)

ture were taken at different intervals, immediately after mixing, 6 and 24 hours aftermixing. The specimens were fixed in 4 % glutaraldehyde, buffered with phosphate to pH 7.4. The fluids were spun and the sediments were fixed again in glutaraldehyde and post-fixed in 2% osmium tetroxide in the same buffer. The fixed tissues were then dehydrated with a series of ascending concentration of ethanol and embedded in Epon-812. One micron-thick sections were obtained with an LKB microtome, stained with toluidine blue, and used for selecting appropriate areas for ultra-thin sectioning. Ultrathin sections were also cut and stained with uranyl acetate and lead citrate. The grid were examined and photographed with a-E2L 100 SX electron microscope at 80 kV.

Plates of 7,240 X - magnification were examined regarding microscopic morphology of fat particles. Evidence of instability i.e. fusion of fat cells or cracked granules were to be noted. Large particles (diameter larger than 4 microns) per one unit area (three fields) were counted. Particles of the largest diameter ware measured and recorded as maximum particle diameter of each sample (D-max). All particles in three field of 22,000 X - magnification were measured and average sizes of each sample were then calculated.

Comparisons were then made between pure 20% Intralipid and mixed all-in-one solutions and among samples collected from different hanging durations. Statistical analysis was performed, using Student T - test. Statistical significance is considered with p-value less than 0.05.

Results

Gross visual observation showed no evidence of precipitating, creaming or oiling-out. Microscopically, fat particles in all admixtures are well distributed without any evidence of particle aggregation or fusion. Morphology of particles in all mixed solution are not obviously differed from those of pure lipid emulsion. No cracked or shrunken particles were noted (Figure 1).

The average diameter of fat particles in 20% Intralipid is 0.418 ± 0.144 microns. Average particle diameters of samples collected immediately after mixing range from 0.341 to 0.595 microns (Table 2). Four of seven immediate samples contain significantly larger mean particle sizes than in pure lipid emulsion. When comparing average sizes of samples collected at the twenty-forth hour to the initial specimen, it was found that there were significant increase in five admixtures.

The maximum particle diameters (D-max) of each sample varied from 1.3 to 4.65 microns whereas D-max of 20 % Intralipid is 1.74 microns (Table 2). Average D-max of 24th hour sample (2.62 microns) is not significantly larger than that of immediate admixture (2.01 microns).

Regarding large particle count, at 0, 6th and 24th hour - post mixing, large sized (over than 4 microns) fat particles were found at averages of 0, 0.14 and 0.29 cells per counting area, respectively. No particle larger than 5 microns was observed in all studying specimen.

Discussion

Since its introduction by Solassal in 1972, all-in-one parenteral nutrition system has gained more popularity in post operative nutritional support in intensive care setting, surgical ward or even home parenteral nutrition because of its relative convenience in preparation and administration.[1-5] It has been widely accepted among pediatric surgeon that parenteral nutrition contributes much to successful surgical outcome. Neonates undergoing surgery of gastrointestinal tract usually can not be fed via enteral route for a few weeks or even months. Lipid emulsion mixed in the all-in-one system lessens the overall solution osmolality thus giving high caloric density.[4-6] Therefore, complete parenteral nutrition is possible to be administered via their peripheral veins during post operative starvation period.

Controversy still exists regarding safety in combining emulsions of fat with other components. Actually,[7-9] fat is the most vulnerable component of the solution. Under inappropriate conditions such as low pH, too much cations and/or too long storage time, fat particles may loss their stability.[4-5] Instability begins with aggregation of fat particles which may progress to particle fusion, developing larger particles. Particles larger than 6 microns have been reported to cause adverse reactions, particularly pulmonary complications. Aggregated particles usually move to the surface of the emulsion, forming a cream layer. Creaming is a stage that can be reversed by gentle agitation. If the aggregated particles are left untreated, they will fused together and finally separate as an oily layer, seen at the

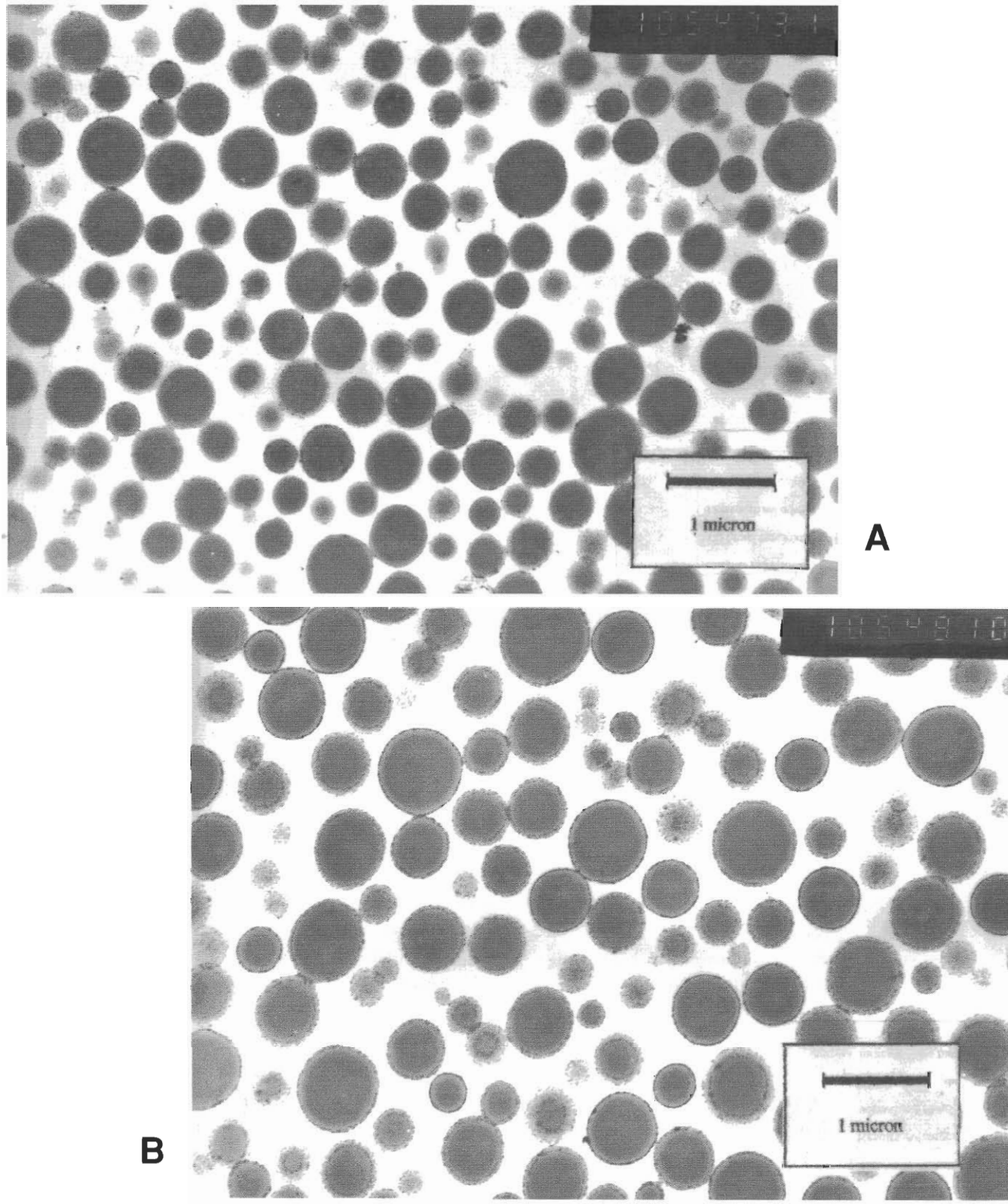

Fig. 1 Microscopic pictures of fat emulsion.

A. 20% Intralipid

B. a 24th hour post mixing sample of all-in-one admixture (X 22,000). Note that the distrbution and particies shape are not significantly different from those of 20% Intralipid.

Table 2 Measurement of fat particles in all-in-one admixtures and count of large particle per three plates of 9,240 X

Admixture no.	Average particle size (microns)			Maximum particle size (microns)			Large particle count (particle/area)		
	Initial	6th-hour	24th-hour	Initial	6th-hour	24th-hour	Initial	6th-hour	24th-hour
1	0.595	0.531	0.506*	2.7	1.84	3.24	0	0	0
2	0.395	0.511	0.509	2.81	3.46**	4.65	0	2	2
3	0.437	0.582	0.503*	1.73	4**	1.4	0	1	0
4	0.341	0.575	0.509*	1.51	3.03	2.59	0	0	0
5	0.361	0.502	0.514	1.95	2.27**	2.6	0	0	0
6	0.419	0.506	0.578	2.06	2.6**	1.73	0	0	0
7	0.542	0.565	0.518*	1.3	3.03	2.16	0	0	0
		Average		2.01	2.89	2.62	0	0.14	0.29

**Significantly larger than average particle size of 20% Intralipid*

***Significantly larger than average particle size of the same bottle at 0-hour (initial solution)*

top of the emulsion. Besides direct visual observation, evaluation of stability can be performed by measurement of particle size and size distribution, microscopic observation and surface potential study. Emulsions that lose their stability have microscopic evidence of aggregation or particle fusion, pathological change of an individual particle, change in particle size as well as size distribution.[4]

Black and Popovich[10] found that concentrated dextrose can deteriorate the lecithin-emulsifying system due to its acidic nature, monovalent cation induced a progressive increase in the rate of globule fusion and divalent cation caused an immediate aggregation of 10% lipid emulsion. Anyway, they also mentioned that the pH-lowering effect of dextrose can be buffered by amino acid solution and combining dextrose - amino acid together with fat emulsions is possible for at least 72 hours. Further study by Pamperl and Kleinberger[11] was carried by mixing 60% glucose, 10% amino acid and 20% lipid emulsions. It was demonstrated by electron microscopic sections that fat particles were damaged by highly concentrated glucose. Various studies have been conducted in "clinically used" all-in-one formulas that possess "not extreme" ranges of dextrose, amino acid or electrolyte solutions and are mixed for a certain infusing duration. Tannuri et al[12] reported that mixing lipid emulsions with dextrose up to 25% concentration, and addition of electrolytes as routinely utilized in parenteral nutrtion, do not cause any damage to fat particles, at least for 24 hours. Sayeed et al[13] evaluated pH, particle size, osmolality and zeta potential of all-in-one admixtures, using various intravenous fat emulsions and amino acids. They found no significant change at one day storage at room temperature or nine day refrigeration at 5°C plus one day at room temperature.

The average size of fat particle in pure 20% Intralipid in this study (0.418 microns) is compatible with previous reports.[14,15] Despite this, there appears to be no evidence of coalescence, the mean particle sizes of admixtures do have slight but significant change, compared to pure emulsions. This increase in particle diameters may be an effect of decreasing zeta potential, caused by the addition of electrolytes or dextrose solution.[4] Moreover, the sizes tend to grow larger over hanging time. Change in average sizes over time goes along with frequency of large particle count, which seems to increase over hanging duration. Nevertheless, particle larger than 5 microns which should not be infused is not detected in all specimen, within 24 hour of routine utilization.

All-in-one parenteral nutrition has been practiced at our pediatric surgical intensive care unit since 1987 with no appreciable adverse effect.[1] The majority of settings are post-operative nutritional support in neonates. This study provide basic scientific data that may legitimize this technique of parenteral nutrition in this patient group. Anyway, the technique is of no side effects at all.[1,4,5] Care must be taken concerning safety range of glucose concentration, mixing consequences and limitation of hanging time. Recommended final dextrose concentration is between 10 - 23 per cent. Electrolytes, trace elements or undiluted dextrose should never be added directly into pure lipid emulsions. Practically, dextrose, aminoacids and

other additives are mixed together in a bottle. Note that calcium should be the last to add to avoid precipitation with phosphate.[8] Lipid emulsion is finally mixed down only if the solution looks clear. At room temperature, the admixture should be administered within 24 hours. Most conservative guidelines for prolonged storage are 7 days at 4°C.[4,5]

Conclusion

Fat particles change their morphology slightly, when mixed in All-in-one PN and hang in room temperature for 24 hours. However, stability is still in accepted range within one day of infusion.

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Factors Associated with the Preference to Undergo Mastectomy or Breast Conservation Surgery for the Treatment of Breast Cancer in Patients of A Tertiary Care Hospital Breast Clinic

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Abstract

Objectives: 1) To identify significant demographic and certain psycho-social factors associated with the preference to undergo mastectomy or breast conservation surgery for the treatment of breast cancer in a sample of patients seen at a tertiary care hospital breast clinic. 2) To identify significant demographic and psycho-social factors associated with the preference to again undergo mastectomy or breast conservation surgery and the felt need for improvement of the external appearance by using prosthesis inserted beneath their brassier (PIB) or breast reconstruction.

Methods: A questionnaire consisting of items measuring demographic variables, preference to undergo mastectomy or breast conservation surgery, the felt need for PIB or breast reconstruction, perceived or actual problems with family, spouse, marriage, and self-confidence or self/body-image, was administered to a sample of patients falling into 2 groups: those with benign or malignant breast disease not yet surgically treated (203 patients) and those with breast cancer within 3 months or later than 1 year after mastectomy (60 patients). In all 263 questionnaires were distributed and returned. Data were analyzed separately for the two groups, using univariate analysis (chi-square), and multiple logistic regression analysis to identify factors associated with treatment preference for the untreated group, and canonical correlation analysis to identify factors associated with the combination of treatment preference and the felt need for PIB or breast reconstruction for the mastectomy group.

Results: Sixty-nine per cent of the untreated group preferred breast conservation to mastectomy for the treatment of breast cancer. Univariate and subsequent multiple logistic regression analysis for the untreated group revealed that only age (<40 years), problems with self/body image (yes), marital status (single) and occupation (student or government officials) were significantly associated with the preference to undergo breast conservation surgery (odds rations [95% confidence interval] were 2.94 [1.5-5.75], 4.18 [1.88-9.31], 2.27 [1.14-4.52] and 2.68 [1.21-5.93] respectively). In contrast, 71 per cent of the mastectomy group preferred mastectomy to breast conservation, through 45 per cent felt the need for PIB or breast reconstruction. Factors associated with preference to undergo breast conservation and need for PIB or breast reconstruction were age (<40 years), educational status (higher than high school), and (perceived) problems with self image (yes) (canonical loadings 0.35, 0.51, 0.61, respectively, overall canonical correlation = 0.64 (P-value 0.019, first root)).

Conclusion: Factors associated with the preference for mastectomy or breast conservation for the treatment of breast cancer include age, problems with self/body image, marital status and occupation, in patients not yet treated for their breast problems. In post mastectomy patients, on the other hand, factors associated with the treatment preference and felt need for PIB or breast reconstruction include age, educational status, and problems with self/body image.

Breast Cancer is the second most common tumor in Thai women. It has a unique, and at times, complex psychological impact, but one to which psychologically healthy women respond well without developing serious psychological symptoms. The increase in the use of breast conserving procedures as the primary treatment of breast cancer is to reduce the negative effect of surgery on self-image and body image. However, ethical and legal constraints relating to treatment options have added substantially to decision-making dilemmas and to fears of recurrence. Greater emphasis is needed on providing support to women during the decision-making period.

This study was performed to evaluate the differences in attitude and psychosocial effect of mastectomy versus breast conserving treatment, to identify significant demographic and certain psychosocial factors associated with the preference to undergo mastectomy or breast conservation surgery for the treatment of breast cancer in a sample of patients seen at a tertiary care hospital breast clinic, and to identify significant demographic and psycho-social factors associated with the preference to again undergo mastectomy or breast conservation surgery and the felt need for improvement of the external appearance by using prosthesis inserted beneath their brassier (PIB) or breast reconstruction.

Methods

A questionnaire consisting of items measuring demographic variables, preference to undergo mastectomy or breast conservation surgery, the felt need for PIB or breast reconstruction, perceived or actual problems with family, spouse, marriage, and self-confidence or self/body-image, was administered to a sample of patients divided into 2 groups: those with benign or malignant breast disease not yet surgically treated (203 patients) and those with breast cancer within 3 months or later than 1 year after mastectomy (60 patients). In all 263 questionnaires were distributed and returned.

Statistical Analysis

All demographic and psychosocial predictor variables were categorized as dichotomous variables. The outcome variables (treatment preference and preference for PIB or breast reconstruction) were also binary. Univariate (chi-square) analysis of the predictive factors for the untreated group was performed and those found to be significantly related to the treatment preference were then entered into a stepwise logistic regression analysis and those significantly remaining were regarded as the final predictive factors. Odds ratio, 95 per cent confidence interval (CI) of the odds ratio and the (two-tailed) p-values were reported. Significant p-values were those < 0.05. For the mastectomy treated group a canonical analysis (regarded as a generalization of the multivariate analysis of variance) was performed since it was felt by us that the three main outcomes for this altter group (treatment preference and preference for PIB or breast reconstruction) should be analyzed together and simultaneously. The reported "important" predictors according to canonical analysis were subjectively chosen as those with consecutively largest predictor canonical loadings. As a final check, all patient data (both groups) were analyzed together to identify significant predictors of treatment preference only, using the univariate chi-square, multiple logistic regression analysis sequence and significance definitions as described previously. Univariate (chi-square) tests of predictors between untreated and

Table 1 Demographic data of patients.

Patients	Age (Means±SD)	occupation (%)		Education (%)	
Untreated group		**stud/govern.**	**housewife/employee**	**Highschool**	**>Highschool**
Unproven CA	33.95 ± 9.93	31.4	68.6	50	50
Proven CA	43.97 ± 8.57	29.2	70.8	62.9	37.1
Treated group					
< 3 mos.	43.11 ± 8.44	17.9	82.1	71.4	28.6
> 1 yr.	46.31 ± 6.65	18.7	81.3	75	25

treated groups were performed as a rough guide to the differences that differences that may exist between them. Statistical calculations were performed with SPSS v. 7.5 (logistic regression and chi-square tests) or STATISTICS v.5 (canonical analysis) software packages.

Table 2 Result of questionnaire from untreated group.

Patients	Image Problems (Yes, %)	Familial Related Problems (Yes, %)
Untreated Group		
Unproven CA	36.9	
Proven CA	34.3	
Treated Group		
< 3 Mos.	14.3	9.1
> 1 Yrs	28.1	14.3

Results

The patient demographics is shown in Table 1. Results of the questionnaire are shown in Tables 2 and 36.9 per cent of the untreated group preferred breast conservation to mastectomy for the treatment of breast cancer. Univariable and subsequent multiple logistic regression analysis for the untreated group revealed that only age (<40 years), problems with self/body image (yes), marital status (single) and occupation (student or government officials) were significantly associated with the preference to undergo breast conservation surgery (odds ratio [95% confidence interval] were 2.94 [1.5-5.75], 4.18 [1.88-9.31], 2.27 [1.14-4.52] and 2.68 [1.21-5.93] respectively) (Table 5). In contrast, 7.1 per cent of the mastectomy group preferred mastectomy to breast conservation, though 45 per cent felt the need for PIB or breast reconstruction.

Table 3 Result of questionnaire from previous mastectomy group.

Patients	Mastectomy Yes, %	Breast Conservation Yes, %	Prosthesis/Reconstruction Yes, % (Recom.)
Untreated Group			
Unproven CA	28	72	
Proven CA	45.7	54.3	
Treated Group			
< 3 Mos.	67.9	32	32.2 (14.3)
> 1 Yrs.	75	25	56.1 (15.6)

Table 4 Untreated group: Significant factor related of decision to undergo breast conservation (relative to mastectomy)

Variables	Odds Ratio	95% C.I.	P-Value
Age (<40)	2.94	1.49-5.75	0.002
Image problems (Yes)	4.18	1.88-9.31	0.000
Marital status (Single)	2.27	1.34-4.52	0.019
Occupation (Student./Govern./office.)	2.68	1.21-5.93	0.015

Table 5 Treated group: Three largest predictor canonical loading: Factors associated with treatment decision and need for breast reconstruction or prosthesis use

Variable	Predictor canonical loading (Root 1)
Image problems	0.61
Education status	0.51
Age	0.35

Canonical correlation 0.64, chi-square (24) 40.44, P-value 0.019, Predictor Redundancy 23.83%

Table 6 Univariated comparision of between untreated and treated groups: Significant differences (with respect to untreated groups)

Variable	Chi square (Yate's Correction)	P-value
Age (Younger in untreated)	21.06	0.000
Education status (Higher in untreated)	7.59	0.006
Image problems (Higher in untreated)	3.93	0.047
Choice of breast conservation (Higher in untreated)	30.11	0.000

Table 7 Combined groups 1 and 2: Significant factors related to decision to undergo breast conservation (excluding family problems)

Variables	Odds Ratio	95% C.I.	P-value
Age (<40 yrs)	3.35	1.85-6.06	0.000
Image problems (Yes)	3.68	1.87-7.25	0.000
Marital status (single)	2.38	1.29-4.37	0.005
Occupation (Student/Government/Office)	2.31	1.16-4.62	0.017
Previous treatment: none	3.74	1.85-7.55	0.000

Within 3 months after mastectomy, 20 and 10 per cent of the women had sexual and personality problems respectively but only 13.33 per cent of the patients wanted to have breast reconstruction. After one year of mastectomy 13.33 and 3.33 per cent still had sexual and personality problems and 56.66 per cent used prosthesis inserted beneath their brassier (PIB) to correct their physical defect. Marital satisfaction was stable after mastectomy. Factors associated with preference to undergo breast conservation and need for PIB or breast reconstruction in the latter groups were age (<40 years), educational status (higher than high school), and (perceived) problems with self image (yes) (canonical loadings 0.35, 0.51, 0.61, respectively, overall canonical correlation = 0.64 [P-value 0.019, first root]) (Table 6). In this study breast conserving therapy was the most favorable choice in all groups.

Discussion

The principal findings of this study revealed demographic and psychosocial factors which may relate to the decision to undergo either breast conserving surgery or mastectomy for the treatment of breast cancer in two groups of patients in our breast clinic. In the first group, which included patients with or without proven breast cancer not yet surgically treated (except perhaps for a previous excisional biopsy), there were a tendency to prefer breast conserving surgery over mastectomy, especially if the patients were young (<40 yrs.), not yet married, having perceived body/self-image problems, and whose occupation included students or government officials. In the second group, comprising patients who had a previous mastectomy for the breast cancer, the preference for treatment, if a second breast cancer were to develop, was (not surprisingly, perhaps) mastectomy over breast conservation. In further analyzing factors associated with the (combined) preference for breast conserving surgery and preference for (or felt need for) post mastectomy external breast prosthesis (PIB) or breast reconstruction, for the latter group, revealed that the most important factors were younger age (<40 years), higher educational status (higher than high school) and, the most important, problems with body/self-image.

Previous studies[1-8] addressed psychological or psychosocial outcomes after mastectomy or breast conserving surgery with aims of identifying various psychosocial problems which could be managed or prevented both prior to and after the operations. Our study has similar ultimate goals but mainly addresses a preventive approach, that is, the results of our study should be of value in the education of breast cancer patients by

emphysizing certain psycho-social aspects strongly associated with the various preferences of treatment such that patients may be able to make informed decisions based on this more patient-relevant data. While many of the previous studies mentioned compared outcomes after the surgery between mastectomy and breast conserving surgery, we did not address problems of comparison, and an attempt was made to present the questionnaire in an unbiased manner.

Still, our results agree in the main with most of the previous studies. We found that marital problems were not important factors in the selection of treatment procedures, even for the group of post-mastectomy patients.[1] This may be because most patients and their families were well adjusted psychologically to the treatments,or that many of the patients were relatively old and not sexually active, or that some patients and their spouses did not have the insight into the possible consequences of treatment (especially for the untreated group). Fears of recurrence of cancer after treatment did not emerge significantly from this study possibly because, as speculated in other studies,[1,2] this fear is probably similar for what ever choice of treatment the patient ultimately chooses or undergoes, given the unbiased information on the procedures received by the patient. But in our study this may have been enhanced by the minimal emphasis we gave to the recurrence problem in the questionnaire. Also of minimal significance was the influence of the diagnosis of cancer upon the decision for treatment option, which we would explain, in a similar manner to Wolberg et al[3] (who found similar levels of anxiety for both benign and malignant breast disease patients), as due to the fact that some of the patients were not aware of their diagnosis during the questioning. We did find, however, as the most significant factor in the choice of surgical treatment the self/body-image problem, as did virtually all other studies. That this factor should be so important is probably not surprising and is easily understood psychologically. Other factors significantly related to the choice of treatment were demographic factors and usually not addressed in detail in other studies since, as we suspect, they are markers of some other psycho-social variables not studied in our questionnaire, or probably related at least partially to the image problem. Nonetheless we feel these relationships of the demographics to the choice of outcome to be intuitively evident.

Various authors found significant relations between time after mastectomy and psychosocial adjustments (Steinberg et al,[2] Wolbeng et al[3]). In the present study, the only factor with statistically significant difference (univariate chi-square) between patients who underwent mastectomy within 3 months of questioning and those over one year was the felt need for PIB and breast reconstruction, and not the choice of treatment. This suggests that, while this group of patients is stable (comfortable?) with respect to their treatment preferences, the problem with self/body-image probably increased with time, as reflected by their desire for improved looks. Or perhaps this latter may simply be due to the fear of another surgery (breast reconstruction) so soon?

It will be noted that the significant factors associated with outcomes in the treated group differed from the untreated group. First of all, the outcome for the treated group was not simply the treatment preference but a combination of treatment preference and preference for PIB or breast reconstruction. Secondly, from Table 4, these two groups of patients were significantly different, being older and less educated in the treated group; these reasons should account for some differences.

As final consistency check, we performed a multivariate analysis of all patients (both groups) combined, identifying factors related to the choice of surgical treatment (Table 7). As would be expected, age, image problems, marital status, and occupation were still significant, but, in addition another factor, namely previous treatment (i.e. previous mastectomy or not), emerged; this is also entirely expected, as we have noted above that the untreated patients preferred breast conserving surgery and mastectomy patients, of course, preferred mastectomy.

The immediate clinical relevance of our study, and also a part of the program in the comprehensive management of breast diseases at our institution, is in the pre-operative phase of patient education to prepare for the perceived problems after surgical treatment (image problem-decisions for the choice of treatment, mastectomy versus breast conserving surgery), knowing that we have provided the information most patients see as relevant. The educational level and age of the patients interested in breast conserving surgery, could dictate, for example, the complexity and detail of the educational material as well as the approach to

presentation of the material.

These are a number of weaknesses in our study, which needs emphasis. Our questionnaire was never validated (although patterned on previous studies,[1-8] and a preliminary reliability testing was not performed. Only one researcher questioned the patients and collected the data and thus possible systematic bias may have crept into the study. Our questionnaire was not comprehensive and certainly did not cover all possible psychological factors related to treatment decisions, but we chose only those most relevant to our practice and time schedule. The design of our study cannot answer in a definite manner the psycho-social or psycho-sexual profiles of the patients before or after treatment and no comparisons can be made without reservation across the groups as obvious bias exists in our inclusion of patients into the various groups. Still, it should suffice to aid in the construction of relevant educational instruments to prepare the patient for post surgical adaptation and/or be an aid in pre-operative patient decision making. Future studies will be needed to answer more specific and treatment related questions in terms of the psycho-social variables which will aid in the phase of a study to determine for optimum treatment strategy for treatment of cancer of the breast when the criteria for breast conservation apply.

Conclusion

It was concluded that healthy Thai women experienced some post-mastectomy distress, primarily in psychosocial functioning. Factors associated with the preference for mastectomy or breast conservation for the treatment of breast cancer include age, problems with self/body image, marital status and occupation, in patients not yet treated for their breast problems. In postmastectomy patients, on the other hand, factors associated with the treatment preference *and* felt need for PIB and breast reconstruction include age, educational status, and problems with self/body image. Couseling is particularly important before the treatment, since this is viewed as the period of maximum stress by most women. The differences in psychosocial, sexual adaptation and the fears of cancer recurrence may yet be different between mastectomy and breast conserving therapy. Further research with larger, more adequate precision in measurement, with random samples, and with post surgical control group is indicated to determine more precisely the factors involved in the choice of treatment modality in breast cancer.

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LAPAROSCOPIC SURGERY

Gasless Mini-Laparoscopic Cholecystectomy: A New Addition to the Minimal Invasive Surgery

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Needscopic or Mini-laparoscopic Cholecystectomy (NLC or MLC) and Gasless laparoscopic Cholecystectomy (GLLC) are both acceptable procedures in the surgical world. In order to add cosmetic value to the already cost-effective and safer type of gasless laparoscopic surgery, the Gasless Mini-laparoscopic Cholecystectomy (GMLC) was planned with the addition of only four new 2 mm instruments (USSC) to the already existing gasless apparatus. Since June 1997, thirty cases were attempted. There were 12 men and 18 women with mean age of 50 years (22-82 years). Any case with CBD pathology, if unable to clear with ERCP were excluded. There was no complication nor mortality. Six cases were converted, 3 to GLLC and 3 to open cholecystectomy due to cystic artery injury or dense adhesions at Calot's triangle. Operating time though twice as long in the beginning, is gradually decreasing as the surgeons gaining experiences. There was no difference in post-operative pain when compared to other method of LC. The patients body stature bore no effect on this operation. The advantage of GMLC includes all the benefits of GLLC plus being cheaper, cost-effective, comparatively safer for elderly with pulmonary or cardiac problems and cosmetically better with more patient's satisfaction. Disadvantages for the time being includes more precise dissection with greater patience and since instruments are not complete, it is being done in only uncomplicated and simpler cases. It is hoped that GMLC will be more applicable for more patients with gallbladder pathology and becomes routine practice in Police General Hospital.

Prospective Routine Laparoscopic Versus Conventional Appendicectomy in Appendicitis

S Kornsuthisopon

Objective: To compare the result and complication of routine laparoscopic and open appendicectomy.

Method: A prospective study during July to December 1997 was carried out in 78 patients with a diagnosis of appendicitis who were to have laparoscopic (54 cases, 8-63 years) or open appendicectomy (24 cases, 14-58 years). The criteria were: (1) operated or delayed to operate not more than 24 hours from the admission and within official hours, (2) in delayed cases, there should be no sign of generalised peritonitis and (3) HIV negative.

All patients were ordered to void before laparoscopy. The laparoscopic techniques used mostly 3 ports (10 mm umbilical port, 5 mm ports at suprapubic and left iliac), or 4 ports under mostly general anesthesia or spinal block+low pressure gas. The appendiceal vessels were coagulated, stumps were double ligated with 2/0 vicryl extracorporeal ENT tonsillectomy knots, and coagulated proximal end after half cut respectively. The appendices were removed via umbilical port.

Result: Diagnoses were missed in 11.11 per cent in laparoscopic group (versus 4.16% in open): PU perforate (1), rupture ectopic pregnancy (1), rupture corpus lutium (2), twisted ovarian cyst (1), liver abscess (1). All of these could be going on by laparoscopy.

In the definitive appendicitis group; 48 laparoscopy and 24 opened were analysed. There was no conversion in the laparoscopy. Laparoscopy took longer time than the open in simple cases (means 30 min versus 15 min) but no difference in difficult cases (mean 72 min versus 70 min). The number of doses of pethidine required and fever in the

immediate postoperative period did not differ. The painful nature was quite different: deep pain at McBurney's point in laparoscopy versus incisional wound pain in the opened. There was no significant difference between time to resumption of fluid and diet intake and the length of hospital stay. There were 3 (12.50%) cases of wound infection in the opened compared with one (2.08%) in laparoscopy ($p<0.05$). There was no stump leakage or bleeding in both groups. No abscess formation or bladder injury was detected in laparoscopy versus one pelvic abscess in the opened case.

Conclusion: Routine laparoscopy is a safe and benefitial procedure for an appendicitis patients. Laparoscopic appendicectomy resulted in fewer number of wound infection.

Changing Concept of Treatment of Repeated Partial Small Bowel Obstruction in Era of Laparoscopic Surgery

T Nimmanwudipong, N Lertakayamanee, P Sessillapachai

Postoperative adhesion is the most common cause of small bowel obstruction. It has been well documented that the chance of recurrent obstruction is higher after each session of relaparotomy. Partial obstruction is usually handled by conservative decompression which unfortunately ended up by repeated admission and finally exploratory laparotomy and adhesiolysis. Repeated admission is economically unsound not to mention the frustration the patient has to confront. It is not an uncommon finding that relatively large laparotomy serve only to remove a very minor adhesion band. Laparoscopic surgery is the ideal management for this situation. Minimal access surgery can minimize scar that potentially cause re-adhesion and still can adequately serve the release of obstruction. The author had performed laparoscopic adhesiolysis in 8 cases of recurrent partial small bowel obstruction. The procedure was successful in 6 cases. Two cases that failed the laparoscopy were the cases with extensive adhesion which was put on conservative treatement.

Outer Diameter of Laparoscopic Trocar Analysis: The Missing Point

W Thanapongsathorn

Problem: The advantage of laparoscopic surgery is small surgical wounds, but the size of each surgical wound is not the same as trocar size which represents the inner diameter of the trocar. Without skin elasticity, the surgical wound is equal to the half length of circumference of outer trocar size which is bigger than outer diameter. How exactly big is it? Nowadays, high technology can make smaller trocar and there are so many different size and type of commercial trocars. So, we should study this basic data for appropriate trocar usage and accurate trocar research.

Objective: This study compares trocar's outer diameter of various companies in Thailand and figures out the size of each surgical wound.

Result:

Inner diameter or Trocar number (mm)	Outer diameter (mm)		Surgical wound (mm)	
	Disposable	Reusable	Disposable	Reusable
1.7	-	2.2	-	3.4
2	2.3	-	4.4	-
3	3.9	3.7	6.1	5.8
5	6.7	5.7	10.5	8.9
5.5	7.5	6.6	11.8	10.4
10	11.6	11.3	18.2	17.7
11	13.5	12	21.2	18.8
12	14.3	-	22.5	-

Summary:

1. Outer diameter always larger than inner diameter because of the thickness of trocar material.
2. Outer diameter of same trocar size, disaposable trocar is equal or larger than reusable trocar.
3. Outer diameter of the same trocar size and type, different companies have different diameter.
4. The surgical wound without skin elasticity is bigger than outer trocar diameter.

Minilaparotomy with Rectus Sparing Cholecystectomy

T Chonladej

Introduction: At present, laparoscopic cholecystectomy is the treatment of choice for gallbladder stone because of minimal pain, short period of recovery and good cosmesis. The author devised a minimally invasive technique for cholecystectomy by small incision, spared rectus muscle which does not require special instruments.

Method: A non-randomized prospective trial of 32 cases of minilaparotomy cholecystectomy (MC) in the patients diagnosed with gallstone was performed at Lerdsin Hospital from July 1996-December, 1997. All of them had preoperative ultrasonography and liver function tests. After general anesthesia, the patient was placed in supine, supported back about epigastric level. The MC technique characterized by 3-5 cm transverse skin incision at level of

the eighth costal cartilage and then two vertical incisions, 1.5 cm right to midline along anterior and posterior rectus sheath, retracted rectus muscle laterally, entering abdomen on the right side of falciform ligament. Finally, cholecystectomy was performed as conventional open procedure.

Results: MC technique was performed successfully in all 32 cases. Mean operative time was 39.84 min (30-55 min). The patients had fluid diet about 3-4 hr after operation, and soft diet on the first postoperative day. All of them were discharged from hospital on the second or third postoperative day. Mean hospital stay was 2.3 days. Five cases required one dose of parenteral analgesia (pethidine 50 mg). One case was complicated with wound hematoma.

Conclusion: The minilaparotomy with rectus sparing approach offers a safe, easy and cost effective alternative to the laparoscopic technique for cholecystectomy, especially when facilities for laparoscopy are not available or when the laparoscopic procedure cannot be performed.

Technique of Laparoscopic Drainage of Liver Abscess in Difficult Area

S Kornsuthisopon

Background: Both pyogenic and amoebic liver abscess are associated with a high mortality rate if there is delay in management. In case of medical treatment failure, drainage by nonsurgical with ultrasound guide or surgical intervention is essential. Open procedure is the standard surgical management but laparoscopy is an attractive alternative.

Objective: To evaluate the role of laparoscopic management of liver abscesses and to propose the techniques of drainage of liver abscesses in difficult area.

Method: The cohort study of 7 large liver abscesses (average 10 cm) managed by laparoscopy during June-September 1996 were analyzed. Fever and tenderness were the pathognomonic symptoms. The large abscesses were misdiagnosed as hepatoma by CT scan but were definitely diagnosed by laparoscopy.

The term 'difficult area' of liver abscess is focused on three areas that may be hazardous to adjacent organs or difficult to access during drainage. These are at superior segment, posterior segment and inferior segments with bowel adhesion.

Technical steps consisted of location, aspiration, deroof and adequate drainage. The position of the patient may be supine or lateral depending on the location of abscess.

Result: By laparoscopy, although the abscesses were completely aspirated and irrigated, there were residual cavities after 2 weeks but reducing in size. All patients had dramatic response, early ambulation and short hospital stay.

Conclusion: Laparoscopy is a safe and benefit procedure for drainage of liver abscess especially in a large abscess and abscess in difficult area that is not easy to access by ultrasound drainage or open procedure.

A Low-Priced Specimen Retrieval Sac for Laparoscopic Cholecystectomy

Y Kongdan, P Pongchairerks, P Bhumisirikul

Introduction: Gallbladder perforation with stone and bile spillage often occurs during laparoscopic cholecystectomy which may increase the risk of severe postoperative complications. We designed a specimen retrieval sac that was made from high quality plastic bag and tested it during routine laparoscopic cholecystectomy performed by laparoscopic surgeons.

Method: Twelve laparoscopic surgeons participated in this trial. They routinely used this new retrieval sac at the end of every case of laparoscopic cholecystectomy performed during November 1, 1997 and January 31, 1998. The retrieval time spent from the moment the surgeon introduced the sac into the abdomen until the specimen was brought through the incision, as well as the occurrence of air leak from the port and the success or failure of the retreival sac was recorded in each case. The reasons for any failure or problem arising from the use of the sac were also noted.

Result: Fifty laparoscopic cholecystectomies were carried out by these 12 surgeons during the 3-month period. Retrieval time ranged from 0.5 to 8.5 minutes using this sac (mean 2.75 minutes). There were only 5 cases whereby the surgeons took more than 5 minutes to retrieve the specimen. Four of them were due to perforation of the gallbladder wall during the dissection with numerous stone spillage and thus necessitated stone collection into the sac. In the other one case, more time was spent to retrieve the thick-walled gallbladder with a very big stone. In this instance, the surgeon had to extend the incision for specimen retrieval. Surgeons subjectively reported that maintaining the sac in the opened position after being introduced into the abdomen was 'excellent' and 'good' for specimen retrieval in 62 and 36 per cent of the cases and the collection of specimen into the sac was easy. Air leak through the port was only minimal and occurred in about 24 per cent of the cases, but the pneumoperitoneum was still adequately maintained in such cases. Surgeons stated

Laparoscopic Colectomy for Cancer

H Nelson

Introduction: Despite many important medical advances, surgery remains the primary treatment modality for patients with newly diagnosed Stage I-III colon cancer. Surgery of the primary tumor not only relieves symptoms and prevents complications, but it also provides important information regarding tumor stage. It is generally accepted that surgery for primary colon cancer should include a thorough abdominal exploration for detection of advanced-staged disease, minimal tumor handling to prevent tumor dissemination, proximal vascular pedicle ligation for generous lymph node sampling, wide bowel margins to prevent local recurrence, and en-bloc resection to improve survival. Staging at the time of primary surgery for colon cancer includes visual inspection and manual palpation of the abdominal cavity for evidence of locally advanced primary or nodal disease, hepatic or peritoneal metastasis. Results from open surgery are well-established, but are at present challenged by the recent introduction of laparoscopic surgery. The following syllabus outlines the rationale for, design of, and early results from a national intergroup trial investigating laparoscopic colectomy for cancer. Simply stated the rationale for a trial is to confirm or refute the risks and benefits of laparoscopic colectomy in the presence of cancer.

Benefits: According to retrospective studies, many of the benefits reported for laparoscopic cholecystectomy are now being realized for laparoscopic-assisted colectomy (LAC). As illustrated in the table below, patient-related advantages have included significant reductions in time for return of bowel function and length of hospital stay. More rapid return of bowel function appears consistent regardless of whether subjective measures such as oral intake or objective measures such as passage of flatus or bowel movements are measured.

Benefits-Length of Ileus (days)

Author	*No. of pts*	*LAC*	*Open*	*Difference*
Senagore	38	3⁺	4.9	1.9
Peters	28	2.3⁺	4.6	2.3
Hoffman	80	2*	4	2
Dean	122	2.3⁻	-	-
Vayer	38	3.1*	3.7	0.6

⁺*oral intake* **flatus*

It is not clear why patients undergoing laparoscopic colectomy tend to experience a lesser degree of postoperative ileus since they undergo the same type of intestinal anastomosis as patients undergoing open colectomy. It has been postulated that the differences in time for a bowel recovery likely reflect differences in overall recovery such as reductions in postoperative pain, narcotics requirements, and a more rapid return to a normal sense of well-being. Regardless of the mechanism of reduced recovery time, there is a translation to reduced length of hospital stay for these patients.

Benefits - Length of Hospital Stay (days)

Author	*No. of pts*	*LAC*	*Open*	*Difference*
Senagore	38	6	9.9	3.9
Peters	28	4.8	8.2	3.4
Hoffman	80	5.2	7.8	2.6
Dean	122	5.7	-	-
Falk	66	5	8	3

Oncologic concerns: Although laparoscopic colectomy offers the possibility of reduced postoperative pain and disabilities, it also introduces an element of risk. For patients with cancer there is considerable apprehension regarding the role of laparoscopic surgery and curative resection. That oncologic outcomes may be compromised is based on two considerations of risk; the first of which is that laparoscopic colectomy provides inadequate staging information, and the second of which is that it may alter the pattern of frequency of tumor dissemination at the time of surgery. Potential risks are summarized below.

Potential risks
- inadequate resection
- inadequate staging
  - lymph node sampling
  - hepatic assessment
- wound tumor implants

The real possibility that laparoscopic colectomy for colon cancer may alter patterns of recurrence comes from a number of anecdotal reports reporting on wound recurrence. Whereas the lowest rate of wound recurrence for laparoscopic colectomy for cancer is presently reported as 0 per cent, the highest rate is as high as 21 per cent. To more precisely define the risk/benefit ratio for laparoscopic colectomy in the setting of cancer, a prospective randomized trial is underway.

Trial design: Intergroup 0146 is a prospective randomized trial being performed by several cooperative oncology groups. This trial is funded by the National Cancer Institute of the NIH. This study intends to recrut and follow 1,200 patients with a clinical diagnosis of curative (Stae I-III) adenocarcinoma of the right, left or sigmoid colon. Patients undergo open or laparoscopic colectomy according to a random assignment. The primary aim of the trial is to test the hypothesis that disease-free and overall

survival are equivalent regardless of whether patients receive laparoscopic-assisted or open colectomy. The second aim will be to determine the safety of laparoscopic colectomy compared to open colectomy, including early and late morbidities and postoperative mortalities. The third aim will test the hypothesis that laparoscopic colectomy is a cost-effective alternative to open colectomy that provides superior quality of life. Based on the sample size of the study, there is a 10 per cent chance that open and laparoscopic colectomy will be truly equivalent, but it will be erroneously concluded that laparoscopic colectomy increases the risk of recurrence. There is a 9 per cent probability of concluding equivalence when there is a true or absolute 6 per cent decrease in 3 year recurrence-free rate for laparoscopic colectomy. To date, nearly 200 patients have been entered on trial. Due to the stratification parameters, patients are evently distributed within the two arms according to anesthesia risk and tumor distribution. It is premature at this time to analyze or report primary end points such as recurrence or survival. However; to address the concern about the adequacy of the extent of extensive resection the following information is provided:

Trial Results-Extent of Resection

Resection (mean, cm)	*Open*	*Lap*
Total bowel length	27	25
Margins, proximal	11	12
Margins, distal	12	9
Mesenteric length	8	9

It appears from early data that the total length of bowel as well as proximal and distal margins and length of mesentery are equivalent between the two groups. Additional information is available regarding potential differences in staging, specifically the number of lymph nodes removed.

Trial Results – Staging

Early Trial Results –	*Mean No. of nodes*
Open –	13 (range 0-31)
Laparoscopic =	12 (range 0-28)

Hepatic Assessment

Laparoscopic inspection + Imaging versus
Intraoperative Inspection + palpation

As was true for extent of bowel resected, the number of lymph nodes removed appears equivalent between the two groups. At this point it is not possible to determine whether hepatic assessment is the same in both groups.

Results from Clinical Outcomes of Surgical Therapy Study Group Retrospective Study

To determine the safety of proceeding with the laparoscopic trial, members of the Clinical Outcomes of Surgical Therapy (COST) study group performed a retrospective study on patients who were operated on for colon cancer prior to activation of the intergroup trial. Sixteen surgeons had performed laparoscopic colon cancer operations. Before the trial, a total of 372 colon cancer patients were identified with a mean follow-up of 23 months (15-45 months). One hundred-forty six of these patients had Stage I disease; 94, Stage II; 64, Stage III; and 68, Stage IV. A total of four trocar recurrences were identified for a rate of 1.1 per cent. Local recurrence was identified in 3.5 per cent of patients and distant recurrence in 11 per cent of patients. When the incidence of trocar recurrences was compared to historical reports by Reilly (0.6%), Hughest (0.8%), and Cass (2.5%) the rate seems comparable to open surgery. In addition stage-specific Kaplan-Meier survival studies show survival rates which are comparable to SIRS data provided by the NCI.

Summary: Results from previous studies suggest that laparoscopic-assisted colectomy is safe, feasible and may offer important patient-related benefits. It is not yet been determined whether the same procedure accomplishes a thorough oncologic resection and/or whether introduces a risk for altered patterns or frequency of recurrence. Early results from a prospective trial and from a retrospective series indicate that the same extensive resection can be performed and that it is safe to proceed with the national trial to more precisely evaluate the risk/benefit ratio of this new procedure.

Laparoscopic Cholecystectomy in Thabo Crown Prince Hospital

W Pareesri

Since the laparoscopic cholecystectomy (LC) was well-known by the report of F. Dubois in 1987, this operation has been rapidly spread throughout many parts of the world and has become the treatment of choice for patients with gallstone disease. The LC is superior over the conventional open cholecystectomy due to less post operative pain, reduced hospital stay and cost, return to normal work sooner, improved cosmesis, and comparable safety to the open technique. In Thailand this procedure has been performed since 1991 but confined only in the well-known hospitals in Bangkok, some central/or general hospital but never in community hospitals. At Thabo Crown Prince Hospital, the 60-bed community hospital, LC was started in July 1994. Until March 1998, we performed this procedure in 844 cases. There were 599 female and 245 male patients. The mean age was 50.4 years (ranging 15-90 years). Thirty five cases (4.1%) were switched to open method due to densely scarred around the gallbladders and porta hepatis. The mean operative time was 32.5 minutes (ranging 10-190

minutes) and post operative stay was 2.6 days. There were 4 cases (0.5%) of CBD injuries. Our result is comparable to other international reports. We, therefore, concluded that the aforementioned technique is safe and better than the conventional one. Especially, it is quite suitable for the treatment of patient suffering from gallstone disease requiring surgery in community hospital.

Simplified Abdominal Wall-Lifting Device for Gasless Laparoscopic Surgery

S Sunpaweravong, R Kuapanich, H Tintara

Gasless laparoscopic technique was developed to avoid complications from high pressure - CO_2. This procedure is less expensive which makes it suitable for Thailand during the current economic crisis. We developed the simplified abdominal wall-lifting device for gasless laparoscopic surgery which is limited to 13.6 kgs to prevent abdominal wall trauma.

We performed gasless laparoscopic procedures on 22 patients: diagnostic laparoscopy with biopsy (N=10), cholecystectomy (N=3, one was changed to gas technique due to morbid obesity), salpingectomy (N=4) and salpingo-oophorectomy (N=5). There were no surgical complications, including a conversion to the open technique. The operative field is similar to that of the gas technique except in morbidly obese patients.

Conclusions: This preliminary experience demonstrated the efficiency of simplified abdominal wall-lifting device and the potential advantages of gasless laparoscopy. Continued modification and application are necessary to delineate the full range of benefits of this technique, especially in developing countries.

CARDIOVASCULAR THORACIC SURGERY

Mitral Valve Repair with Autologous Pericardium Ring: An Early Result

T Chotivatanapong, C Yosthasurodom, P Chaiseri, V Sungkhahapong, C Kasemsarn, S Chotikul

Mitral valve annuloplasty has an important role for longterm stability of mitral valve repair. Several techniques have been used for this purpose. In this study, we would like to review our result of using autologous pericardium ring for posterior annuloplasty in mitral valve repair.

From October 1997 to March 1998, a total of 19 patients underwent mitral valve repair using autologous pericardium ring for posterior annuloplasty at Central Chest Hospital. There were 12 males and 7 females. Their ages ranged from 18 to 71 years old with a mean of 42.6 years. Follow-up ranged from 1-6 months with a mean of 2.8 months. The majority of them were caused by rheumatic disease (10). Other causes included degenerative disease (5), infective endocarditis (2), ischemic heart disease (1) and congenital disease (1). Preoperative diagnoses were mitral regurgitation (7), mitral and aortic regurgitation (5), mitral stenosis (2) and others (5). Isolated mitral valve repair were done in 8 patients. Other associated operations were aortic valve replacement with autologous pericardium (3), aortic valve replacement (2), aortic valve repair (2), tricuspid valve repair (2), coronary artery bypass grafting (1) and closure of ventricular septal defects (1). The most commonly used surgical procedures were posterior annuloplasty, resection of secondary chordae, suture annuloplasty and neochordal implantation with polytetrafluoroethylene suture. The average mitral valve repair procedures per patient in this study is 4.1. The average bypass time and aortic clamping time were 160 and 124.2 minutes respectively. There was one hospital mortality due to acute respiratory tract problem. There were no thromboembolic complication or reoperation during the period of this study. The functional status as well as the degree of mitral regurgitation improved substantially after the operation.

In conclusion, use of autologous pericardium ring for posterior annuloplasty can be done safely as an alternative technique for mitral valve annuloplasty. Longterm follow-up is needed to assess the durability of this technique.

Coronary Artery Bypass Grafting with Radial Artery: Early Results

T Chotivatanapong, C Yosthasurodom, P Chaiseri, V Sungkahapong, C Kasemsarn, S Chotikul

Coronary Artery Bypass Grafting (CABG) using arterial conduit has gained increasing attention because of excellent longterm result of the internal mammary graft (IMA). Radial artery was first used by Carpentier and associates in 1973 but was soon abandoned due to unfavorable results from its strong tendency to spasm. Current use of calcium channel blocker had improved early results as reported by Acar and colleagues in 1992. In this study we would like to review our early results of using radial artery for CABG in our patients.

From December 1997 to April 1998, a total of 12 patients underwent CABG using radial artery as coronary conduit at

Central Chest Hospital. There were 11 males and 1 female. Their ages ranged from 52-72 years old with a mean of 59.8 years. A total of 45 distal anastomses were performed with a mean of 3.73 distal anastomoses per patient. Left radial artery and Left IMA were used in all patients. Bilateral IMAs and bilateral radial artery were employed in 6 and 1 patient respectively. Total arterial revascularization were performed in 5 patients. Operation included CABG (11), CABG+mitral valve repair (1) and CABG+ closure of VSDs (1). The average bypass and aortic clamping time in this study was 151.83 and 112.08 minutes respectively. There were no hospital mortality or neurovascular complication of upper extremity during this study. Perioperative infarction occurred in one patient.

In conclusion, radial artery can be used for CABG safely in our patients. Its role as one of the arterial conduit should be considered. Longterm follow-up of its patency is mandatory.

Emergency Coronary Artery Bypass Surgery Following Acute Myocardial Infarction, Early and Late Results

S Chaiyaroj, K Jirasan, C Dumrongrat, C Chanchao, N Boonme

Aims of treatment of acute myocardial infarction are to prevent death and loss of myocardium, maintain ventricular function and improve patient's quality of life. Immediate revascularization by non-operative methods may not be adequate or suitable. Surgical treatment is considered when other measurements are failing.

Emergency coronary revascularization was performed in 6 men, mean age of 61.6 years, range from 43 to 72 years. Indications for surgery were severe left main disease (6), cardiogenic shock (5), post infarction angina (3) and failed angioplasty (1). There was no hospital mortality. Echocardiogram was performed in all patients for left ventricular function assessment. The follow-up was complete. At mean follow-up of 25 months, all patients were in functional class I&II with significant symptomatic improvement.

We have demonstrated that in this subgroup of coronary bypass patients, though at high risk, did have good early and late results from surgery. Hence, emergency coronary bypass following acute myocardial infarction is possible with caution and selectivity.

VATS: Early Experience in Maharaj Nakorn Chiangmai Hospital

S Saeteng, P Siriwittayakorn, N Chotirosniratmit, W Nawarawong

Video-assisted Thoracoscopic Surgery (VATS) is now a widely accepted surgical procedure in thoracic surgery.

At Maharaj Nakorn Chiang Mai Hospital since 1996 we have performed 18 VATS cases, 6 for primary and secondary spontanous pneumothorax, 2 for chest trauma, 4 for empyma thoracis, 4 cases were done for diagnosis of pulmonary nodule and 2 for mediastinal mass with 100 per cent yield.

Four cases (22.22%) were converted to open thoracotomy due to multiple emphysematous bullaes and dense adhesion. There is no mortality and significant complication.

VATS can replace thoracotomy with good results and less morbidity in a selective group of patients.

Can Albumin as Priming Solution Improve Post Cardiopulmonary Bypass Platelet Quantity? A Prospective Randomized Comparison Between Albumin and Polygeline in Patients Having Elective Coronary Artery Bypass Grafting Surgery

S Leelahanon, S Singhatanadgige, S Thungsupachai, K Luengtaviboon, J Namchaisiri, S Wetwithan, JG Bennett, B Neamin, A Comyod

Introduction: Cardiopulmonary bypass (CPB) has several adverse effects in physiologic functions. One of the physiologic disturbances is platelet quantity. Decreasing in platelet quantity after CPB is one of major causes of postoperative bleeding. Thrombocytopenia is partly caused by platelet adsorption to circuit surface. Theoretically, albumin coated surface may prevent platelet adsorption on biomaterial. At Chulalongkorn Hospital, using of polygeline (Haemacel®) as colloid priming solution is widely accepted. This study is designed to investigate the influence of albumin as priming solution compared with polygeline on the post cardiopulmonary bypass platelet quantity and post operative bleeding.

Research Design: Prospective randomized controlled study.

Patients Selection: Forty two adult patients who were undergoing operation for their first time coronary artery bypass grafting surgery (CABG) at Chulalongkorn Hospital between November 1, 1997 and February 28, 1998 were selected in this study.

Method: Patients were randomized into two groups, A and B. Twenty one patients in group A were designed to use normal serum human albumin as priming solution. The other twenty one patients in group B were designed to use polygeline as priming solution. All patients, anesthetists, surgeons and ICU personnel were blinded.

Results, Analysis: Both groups were demographically and hemodynamically matched. There were no differences in blood chemistries and operative techniques between both groups. After cardiopulmonary bypass was done, there were no differences in platelet quantity, hemoglobin level and white blood cell count. There were no differences in number and

percentage of platelet lost between both groups. One patient in polygeline group was reoperated because of postoperative massive bleeding. This bleeding episode did not relate to thrombocytopenia. There was no difference in reoperation rate between both groups. Excluding this bleeding case, there were no differences in platelet quantity, hemoglobin level and white blood cell count in the first 24 hours after admission to ICU. Excluding the bleeding case, there were no differences in postoperative bleeding and platelet transfusion between both groups. There was no advantage in using albumin over polygeline for priming solution in hematologic point of view for the first 24 hours after operation.

Conclusion: Taking into consideration albumin's expensiveness, polygeline is superior to albumin for priming the solution.

Laparoscopic Assisted Management of Thoracic Esophageal Perforation: A Better Approach

T Nimmanwudipong, P Seesillapachai, N Lertakayamanee

Thoracic esophageal perforation is a serious condition requiring prompt surgical treatment. To minimize mortality and morbidity, thoracotomy is usually needed to handle mediastinitis and to ensure adequate drainage and diversion. Reoperation after the first thoracotomy is not infrequent and usually problematic and traumatic to the patient. The authors had combined the use of video-assisted thoracoscopy and PEG tube to identify the site of perfortion, performing mediastinal and pleural cleansing and to provide esophagocutaneous diversion all at the same time. This approach minimizes the surgical trauma to the patient and gives way for rapid recovery. If the primary procedure is inadequate, REDO laparoscopy can be done repeatedly. Two cases of thoracic esophageal perforation has been successfully managed.

Tracheal Reconstruction in Childhood Under Cardiopulmonary Bypass Support: A Case Report

P Samankatiwat, S Boonkasem

Introduction: Tracheal reconstruction during childhood is one of the difficult procedures owing to small size of the body and inadequcy of exposure. Airway manipulation is also complicated. This report presents a case of congenital tracheomalacea which successfully underwent tracheal reconstruction with the aid of cardiopulmonary bypass (CPB).

Patient and Method: A 4 year-old boy (normal delivery with birth weight of 3000 gm) presented with respiratory distress early after birth due to upper airway obstruction from tracheomalacia. He was improved for one month by position management. He was in a considerably good condition and frequently needed bronchodilator.

Four months before admission, he was again taken to the hospital and bronchoscopy was performed. Tracheal obstruction was diagnosed. Repeated bronchoscopy and laser therapy were tried for several occasions. Cardiac arrest once occurred during bronchoscopic examination. He was then referred to Ramathibodi Hospital on account of failure of laser therapy.

On examination, he was tachypnic with retraction of suprasternal notch and in use of accessory respiratory muscles. There was expiratory wheezing and prolonged expiratory time.

Bronchoscopy examination revealed circumferential stenosis of the tracheal lumen, about 3 mm in diameter, at the level of 0.5 cm above the carina.

Tracheal reconstruction was performed under cardiopulmonary bypass support. The trachea was exposed and its stenotic part was identified. The stenotic part was approximately 1.2 cm in length and 1 cm in external diameter. Its lower limit was 0.5 cm above the carina. CPB was supporting the circulation while the heart was beating. The trachea was encircled and the stenotic part was resected while the carina could be preserved. The trachea was reconstructed by end to end anastomosis with 3-0 prolene interrupted sutures. CPB time was 1 hr, 25 min. He was extubated in the following day and remained in full cervical flexion for two weeks. There was no immediate and late postoperative complication. Blood loss was minimal. The subsequent chest roentgenography and tomogram of the trachea showed patency of tracheal lumen (3 months postoperatively).

Discussion: Tracheal reconstruction in childhood is one of the difficult procedure. Airway management is somewhat cumbersome, causing possible frustration during surgery. Cardiopulmonary bypass (CPB) is helpful in facilitating the operation. Some surgeons are afraid of bleeding problem during postoperative period. But we found that tracheal reconstruction under CPB support is safe with minimal blood loss postoperatively.

Transatrial-Transpulmonary Repair of Tetralogy of Fallot

V Benjacholamas, C Numchaisri

Objective: Transannular corrections with ventriculotomy is a part of the classical technique for correction of tetralogy of Fallot. This technique impairs the right ventricle and increases risk of right ventricular failure postoperation. Pulmonary regurgitation is also the problem in long term follow-up. Therefore, transatrial-transpulmonary repair without ventriculotomy was selected in patient with adequate size of pulmonary artery and pulmonic valve annulus.

Methods: Tetralogy of Fallot was repaired by a transatrial-transpulmonary approach in 16 of 25 patients treated surgically on one surgical service between May 1995 and May 1998. Their ages ranged from 3.5 to 35 years (mean 12.5 years). The

ventricular septal defect was closed through the right atrium and tricuspid valve, and the infundibular hypertrophy was resected by a combined approach through the tricuspid and pulmonary valve orifices. The avoidence of a ventriculotomy can be suggested preoperatively by selective angiocardiogram and comfirmed by intraoperative assessment.

Results: All patients needed low dose of inotropic drug and recovered well within 2 days after operation. The echocardiography postoperation revealed no significant gradient across pulmonic valve and right ventricular out flow tract. There was no mortality in this series.

Conclusion: This approach can be performed in two thirds of the tertralogy of Fallot patients. The operative risk was similar to or lower than transventricular repair and also useful in patients with anomalous in origin of the left descending coronary artery. Finally, this approach will result in better preservation of right ventricular function in the long term.

Impending Rupture of Coarctation of The Thoracic Aorta During Pregnancy

W Slisatkorn, P Thongcharoen, T Subtaweesin, T Phanchaipetch, S Pornvilawan, P Laksanabunsong, S Sriyoschati, P Sakiyalak

A 19 year-old woman presented during the third trimester of her first pregnancy with complaint of chest pain. Physical examination revealed hypertension and difference in blood pressure between both arms. Chest x-ray showed a round opacified mass at left upper lung field with left pleural effusion. CT chest suggested thoracic aortic aneurysm extended distal arch to proximal descending aorta. Pelvic examination revealed 1 cm os, with 25 per cent effacement. The child was delivered by emergency Caesarean section and the patient was operated 6 hours later with gel-seal graft interposition and left subclavian artery reimplantation under femoro-femoral bypass. The patient and the baby were dismissed one week after the operation with good result.

Recurrent Hemoptysis Caused by Left Subclavian Artery Aneurysm: A Case Report

T Phanchaipetch, P Laksanabunsong, P Thongcharoen, S Sriyoschati, T Subtaweesin, P Sakiyalak, S Pornvilawan

Subclavian artery aneurysms are rare and may be due to degenerative disease, traumatic, infectious or congenital causes. Diagnosis is important as complications can be life threatening.

We report a 41 year-old man with a left subclavian artery aneurysm presenting manifestation of recurrent hemoptysis. CT scan and angiography confirmed the diagnosis. Surgical treatment consisted of femoro-femoral cardiopulmonary bypass and left thoracotomy, aneurysm resection and descending aortico-subclavian vein bypass grafting. The incidental two small saccular aneurysms of the lower descending thoracic aorta were excised and directly repaired. The pathologic study revealed typical atherosclerotic changes. He had postoperative persistent chyle leakage and successfully managed by rethoracotomy and supradiaphragmatic ligation of the thoracic duct.

Two-Stage Operation for Arterial Switch Correction of Transposition of the Great Arteries with Intact Ventricular Septum

S Sriyoschati, P Thongcharoen, U Prakanrattana, S Pornvilawan, P Laksanabunsong, D Laohaprasitiporn, T Phanchaipetch, P Sakiyalak, A Nana, T Subtaweesin

From August 1994 to March 1997, fourteen cases of transposition of the great arteries (TGA) with intact ventricular septum, age ranged from 5 to 12 months, mean 7.7 months underwent pulmonary artery banding for left ventricular retraining followed by arterial switch operation. Thirteen cases were banded without modified Blalock Taussig shunt. One case needed 4 mm Goretex shunt. The mean period of banding varied from 7 to 27 days (mean 16.14 days). The systolic pressure proximal to the band varied from 68 to 96 per cent (mean 80%) of the systemic pressure. The oxygen saturation after banding varied from 65 to 81 per cent (mean 72%). Three cases underwent cardiac catheterization before arterial switch repair, revealed the left ventricular/systemic pressure ratio varied from 0.7 to 1.0. All patients underwent arterial switch repair with uneventful recovery.

Conclusion: Pulmonary artery banding in TGA with intact ventricular septum is a good surgical intervention to prepare the left ventricle for subsequent arterial switch repair.

Double Annulus Patch Enlargement by Manouguain's Technique: A Case Report and Review of Literatures

P Thongcharoen, P Laksanabunsong, T Subtaweesin, S Sriyoschati, T Phanchaipetch, P Sakiyalak, S Pornvilawan

We report a case of aortic and mitral stenosis with small aortic root underwent double valve replacement with double annulus patch enlargement. The aortic and mitral annulus were enlarged in continuity with gel-sealed woven dacron patch using the technique described by Manouguain. By this technique the aortic annulus was able to be enlarged from less than 19 mm to 23 mm in diameter. The early postoperative result was good without any bleeding complication, although the patient had to be reoperated on the fifth operative day because of mitral prosthetic valve malfunction due to chordae entrapment. After the entrapped chordae was removed, the patient improved dramatically. This aortic patch and mitral annulus enlargement is an effective technique and is able to increase the

small aortic annulus diameter about 30 per cent.

A Case of Intestinal Ischemia Associated with Acute Type B Aortic Dissection

S Sriyoschati, S Pornvilawan, P Thongcharoen, P Laksanabunsong, T Subtaweesin, P Sakiyalak, T Phanchaipetch

The case was a 39-year-old who was referred to Siriraj Hospital with complaint of severe chest and back pain of sudden onset and diagnosed as acute type B aortic dissection. CT of the chest and abdomen revealed acute type B aortic dissection started from descending aorta down to suprarenal abdominal aorta. Inspite of intensive medical treatments, severe abdominal colicky pain still persisted. Emergency operation consisting of mini-laparotomy revealed non pulsatile mesenteric artery of the small bowel. Then the left chest was opened and the short segment of graft interposition was performed at proximal descending aorta. The mesenteric artery pulse was normal at the conclusion of surgery. The patient had uneventful recovery after the surgery and has been followed up for 17 months.

Surgical Treatment of Active Infective Endocarditis

C Tontisirin, C Kuptanond, S Prathanee, S Pitaksinagenkit

Infective endocarditis is complex disease associated with a high mortality. The surgical management reduces mortality but the timing and results are still controversial. So we reviewed our experience herein.

The retrospective study of surgical treatment of infective endocarditis during 1984-1997 in Cardiovascular and Thoracic Surgery Unit, Srinagarind Hospital. There were 107 patients, 27 were female, and 80 were male. The age range was 10-65 years. Preoperative function classification was IV (79%), III (18%), II (3%). The underlying condition were rheumatic heart disease 63/107 (58.8%), native valve 28/107 (26.16%), congenital 11/107 (10.28%), prosthetic valve 4/107 (3.7). The causative organisms found in culture were streptococci 39.68 per cent, pseudomonas 6.34 per cent, enterococci 6.34 per cent, fungus 3.77 per cent and other 6.00 per cent, no growth 28.97 per cent. There was aortic valve ring abscess in 25 cases. The involved lesion were aortic valve 50 cases, mitral valve 30 cases, aortic and mitral valve 21 cases, tricuspid valve 7, and other 3. The mortality was 25/107 (23.36%) and the causes of death were heart failure 10/25, emboli to brain 4/25, sepsis 4/25, heart block and arrhythmia 4/25, bleeding 2/25, and valve malfunction 1/25. In mortality group, there were preoperative function classification IV 24, shock 7, aortic root abscess 11, neurological evidence 6, heart block 4, large vegetation 6 and aortic valve lesion 18. The other complications were CVA 3, renal failure 1, heart block 1, mycotic aneurysm of brachial artery 1. Sixty seven patients were followed up with good health, loss follow-up in 7 cases and late dead in 8 cases.

In conclusion, based on this study; (1) Surgical treatment shoud be performed earlier in congestive heart failure, the causative organisms were staphylococci, gram negative baccilli and fungus, large vegetation (>1cm) and the presence of aortic root abscess, (2) Risk factors are function class IV, aortic valve involvement, preoperative neurological deficit, aortic root abscess and heart block.

Asymptomatic Large Anterior Mediastinal Lipoma, A Case Report

A Chotiroseniramit, W Kattipatanapong

Mediastinal lipoma is a rare anterior mediastinal tumor (1.8%). It is one of mesenchymal tumor in mediastinum that usually locates in anterior mediastinum. We report a case of 31 year-old female that had an asymptomatic large lipoma in anterior mediastinum. She came to the hospital because of renal stones symptoms without previous history of dyspnea or chest pain. Her chest wall was asymetrical and decreased breath sound with dullness on percussion were demonstrated on the left. Chest films showed a large anterior mediastinal mass with heart being displaced to the right. CT finding showed large hypodensity mass in anterior mediastinum that extended into both pleural cavities, mainly in the left. Left anterio-lateral thoracotomy was successfully performed for removing the tumor.

UROLOGY

Early and Long Term Result of Stamey Operation for Female Stress Urinary Incontinence

K Ratana-olarn, U Roongruansilp, W Kochakarn, B Sukwattanasinit, S Leungwattanakij

Problem & Background: Stamey operation is one of the more favorable procedures to correct female stress urinary incontinence. Though it has a high initial success rate, there are many reports showing a continuous decline in the cure rate with time. The aim of this report is to assess early and long term results of this operation performed in our institute. The result may lead to our decision making to continue or discontinue this operation in the future.

Patients and Methods: From 1988 to 1996, there were 85 women who underwent Stamey operation for their stress urinary incontinences. Questionnaires were sent to all of them to assess the results of the operation. Data was collected from

60 women who answered the questionnaires.

Results: Of the 60 patients, 54 (90%) had an initial cure, 5 (8.3%) improved and 1 (1.7%) had no improvement. After one year postoperatively, 38 (63.3%) were cured, 19 (31.6%) had improvement and 3 (5%) had no improvement. At the mean 2.5 years follow-up (range 1-5 years), 27 of 53 patients (50.9%) were cured, 21 (39.6%) had improvement and 5 (9.5%) had no improvement. At the mean 7.5 years follow-up (range 5-9 years), 11 of 34 patients (32.4%) were cured, 20 (58.8%) had improvement and 3 (8.8%) had no improvement. However, we also assessed their satisfaction with this type of operation. It was found that 31 (51.6%) had high satisfaction, 17 (28.4%) had moderate satisfaction, while 12 (20%) had low satisfaction.

Discussion: Our follow-up results of the Stamey operation were comparable with the other reports i.e. high initial successful rate but a continuous decline in the cure rate with time. Despite long term failure, this operation remains attractive because of its simplicity, small surgical wound and short hospital stay. Retropubic colposuspension and pubovaginal sling operations have achieved relatively better outcome than Stamey operation but those 2 procedures have larger wounds and longer hospital stays. The decision making should rely on each urologist's preference.

Experiences of Transrectal Ultrasonography (TRUS) as the Evaluation in Prostatic Diseases and Other Urological Problems

D Watanachote

Introduction: For a period of three years, from March 1995 to February 1998, we have been using transrectal ultrasonography performed by urologist as part of the urological outpatient examinations. The equipment used was the Combison 311, an ultrasound system with a 7.5 MHz two-plane transrectal probe, capable of real-time scanning through transverse and longitudinal sections. Selection of subjects was based on their initial clinical indications including: (1) the evaluation of lower urinary tract symptoms or prostatism (LUTS), (2) prostate cancer or suspected cancer work-up with biopsy, and (3) clinical symptoms of acute prostatitis. Subjects were also selected from other miscellaneous urological diseases or problems.

Objectives: To analyse clinical data gained from TRUS examination of prostatic and other miscellaneous genitourinary tract diseases, particularly prostatic hyperplasia, prostate cancer, and prostatitis.

Method & Results: We had designed a one-page record for the TRUS findings, of which would be filled by the urologist and nurses in charge after the TRUS examinations. The analysis was conducted on 445 patients with age ranging from 22 to 95, at an average of 62 years. All patients received digital rectal examination (DRE), while PSA test was performed on 285 cases where symptoms were indicated. Three hundred and five out of 316 patients who had lower urinary tract symptom or prostatism (LUTS), were diagnosed to have BPH of which 209 received the PSA test. We usually consider prostate sizes as Gr 0: < 20 ml, Gr 1: 20-29 ml, Gr 2: 30-49 ml, Gr 3: 50-99 ml and Gr 4: > 100 ml. The data shows patients' age < 40 (3 cases), 40-49 (8 cases), 50-59 (52 cases), 60-69 (90 cases), 70-79 (48 cases) and >80 (8 cases). With respect to the age range as mentioned above: those below 40 years have an average prostate size of 27.0 ml, PSA 1.43 ng/ml, and PSAD 0.05 ng/ml prostate; age 40-49 years have an average size of 24.1 ml, PSA 1.95 ng/ml, and PSAD 0.07 ng/ml prostate; age 50-59 years have the average of 30.3 ml, PSA 4.8 ng, and PSAD 0.14 ng/ml prostate; age 60-69 years average at 36.0 ml, PSA 5.8 ng/ml, and PSAD 0.16 ng/ml prostate; age 70-79 years equaling 41.4 ml. PSA 8.1 ng/ml, and PSAD 0.21 ng/ml prostate; and age over 80 years the average of 26 ml, PSA 8.2, PSAD 0.33. The other 11 out of 316 patients with LUTS were diagnosed by TRUS to have median bar elevation or suspected contracted bladder neck (CBN) without lateral lobes enlargement. There were 31 patients diagnosed of prostate cancer : age 50-59, 2 pts, average prostate 20.5 ml, PSA 20.49 ng/ml; age 60-69, 11 pts, average prostate 44.75 ml, PSA 61.84 ng/ml; age 70-79, 17 pts, average prostate 47.52 ml, PSA 74.60 ng/ml and one case age over 80, prostate volume 40 ml, PSA 90.34 ng/ml. Those of clinical acute prostatitis were found in 28 cases; average prostate volume 31.36 ml, average PSA 9.27 ng/ml. Other diseases and problems include 43 miscellaneous viz, seminal vesicle cyst, clinical hemospermia, urethral bleeding, occult neurogenic or neurogenic bladder and so on.

Conclusion: TRUS is thus considered a part of the urological routine practice, almost similar to cystoscopy. TRUS findings can be very useful by adding more precision in the evaluation of prostate size and the perspective of the prostate gland, which then can be advantageous for choosing the right treatments and proper follow-ups for the patients.

Preoperative Laparoscopy in the Management of the Nonpalpable Testis

B Lojanapiwat, S Soonthornphan, S Sripralakrit, S Wudhikarn, S Pooriyapan

The purpose of laparoscopy in the management of the nonpalpable testis is to provide information regarding the testicular presence and location to facilitate overall surgical management.

Laparoscopy was performed at operation in 20 patients between 14 months to 21 years old (average 63 months), who had 22 nonpalpable testes.

Of the testes 13 (59%) were in the inguinal region or just proximal to the inguinal ring, 8 (36%) were in a high intraabdominal position and 1 (5%) was absent.

Anatomical localization of nonpalpable testes facilitated accurate planning of operative repair and the laparoscopy rendered exploration unnecessary in patients with intra-abdominal vanishing testes syndrome. Laparoscopic orchiectomy is the treatment for the unilateral intraabdominal testes in patients more than 10 years old.

Epidermal Growth Factor Receptor Expression - Predictive Value for the Outcome after Cystectomy for Bladder Cancer

S Sripalakij, S Wudhikarn, S Johnson, MG Karlsson

Objective: To determine wheter epidermal growth factor receptor (EGFR) immunostaming of tumour cells was associated with cancer specific death after cystectomy for locally advanced bladder cancer.

Patients and Methods: The hospital records of all patients treated with cystectomy for urothelial cancer of the urinary bladder between 1967 and 1992 were retrospectively reviewed. The paraffin-embedded specimen obtained before treatment from 173 patients were processed for immunohistochemical staining, using the monoclonal antibody NCLEGFR (Novocastra, UK). EGFR immunostaining was defined to be positive if membrane staining was found in at least 20 per cent of tumor cells in one or more fields at 200x magnification.

Results: The majority of the patients received preoperative irradiation (149 patients) and one patient had neoadjuvant chemotherapy. The mean observation time was 81.3 months. Sixty-three patients (36%) had tumour recurrence within 1 - 80 months (mean 18.3 months). Positive EGFR immunostaining was found in 100 patients (58%). The proportion of T_{2-4} was higher in the EGFR positive group compared to the EGFR negative group. A proportional hazards analysis revealed that clinical stage was significantly associated with cancer specific death but EGFR expression was not.

Conclusion: Although immunostaining of EGFR was found more frequently in higher stages of locally advanced bladder cancer, this variable was not an independent predictor for outcome after cystectomy.

KUB Injury at Udornthanee Hospital

S Munsongthum, T Thumboworn, S Theratuntikanon, J Samrit

This study of KUB injury at Udornthanee Hospital covered a period of one year from April 1, 1997- March 31, 1998. There were 41 cases of which 36 were males (88%) and were 5 females (12%). The proportion male : female is 7.2:1. The peak age group is 21-30 yrs., 15 cases (37%) and most age group is 11-40 yrs., 32 cases (78%). Udornthanee province has the maximum number of 27 cases (66%). Focus at Udornthanee province, Amphur Moung has the maximum number of 8 cases (20%). Blunt trauma is the main cause in 38 cases (93%) in which traffic accident is the majority of 28 cases (68%). The main injured organs are kidney 22 cases (54%), bladder and ureter in 7 cases (17%). The main associated injured organ is bony fracture in 8 cases. The main treatment is surgery of nephrectomy 13 cases and repair of bladder 7 cases.

Epidemiology of Urinary Calculi at Udornthanee Hospital

S Munsongthum, T Thumboworn, S Theratuntikanon, J Samrit

This descriptive study covered a period of one year from April 1, 1997- March 31, 1998. Total number is 654 of which 421 are males (64%) and 232 are females (36%) and the proportion male:female is 1.8:1. The peak age group is 41-50 yrs (158 cases, 24%) and the major age group is 41-50 yrs (430 cases, 66%). Udornthanee province has the maximum of cases (498 cases, 76%). Within Udornthanee province, Amphur Moung has the maximum of cases (108 cases, 22%). There are 496 cases of renal calculi, 125 cases of ureteric calculi (18%), 57 cases of vesical calculi and 7 cases of urethral calculi. The proportion of upper tract stone to lower tract stone is 10: 1. There are normal creatinine in 548 cases (84%), normokalemia 543 cases (83%), hypokalemia 96 cases (18%). The reports of urine culture showed no growth 59 per cent, Staph spp 14 per cent and E-coli 12 per cent. The main treatments are open surgeries (57%) of which nephrolithotomy is the most common procedure (20%) and 29 per cent for ESWL.

Comparison of the Bard BTA Test with Voided Urine Cytology in the Diagnosis and Monitoring of Bladder Carcinoma: Chulalongkorn Hospital Experience

K Sunchatawirul, W Kittikowit, K Prasopsanti, S Yenrudi, P Sampatanukul

Introduction & Aims: Bladder cancer is the most common urinary tract malignancy and recurrent rates after transurethral resection of bladder tumor are 50-80 per cent. Therefore, patients must be re-evaluated at frequent intervals by cystoscopic examination that is quite invasive. The urine cytology examination is less invasive but low in sensitivity. The BTA test is a new diagnostic test for bladder cancer. The aim of this study was to evaluate the sensitivity and specificity of the Bard BTA test compared with voided urine cytology in the diagnosis and monitoring of patients who were suspected of having bladder cancer.

Materials & Methods: The BTA test is a latex agglutination test that qualitatively detects the presence of basement membrane complexes in the urine. These complexes are released into the urine when tumor cells become invasive or secrete enzymes that breakdown the basement membrane of

the urothelium.

: A prospective, blinded study.

: From March 97 - December 97, 90 subjects (70 males and 20 females: mean age 63 years) underwent voided urine cytology, urine BTA test and cystoscopy.

Result: Cystoscopy or cystoscopy and biopsy revealed bladder cancer in 35 subjects (39%). The overall sensitivities of BTA test and cytology were 80 and 49 per cent, respectively (p=0.001). The specificities of the BTA test and urine cytology in 55 subjects without bladder cancer were 95 and 95 per cent, respectively.

Conclusion: The BTA test is considerably more sensitive than voided urine cytology in the detection of bladder cancer. This test is a simple, rapid and noninvasive. It is a useful test to use as adjunct to cystoscopy in the initial diagnosis and monitoring of bladder cancer patients.

Intravesical 2 % Formalin Instillation for Radiation Cystitis with Intractable Hemorrhage

S Thanawongvibul, S Soontrapa, T Bhanalaph

Intractable urinary bleeding from irradiation for pelvic cancer especially carcinoma of cervix is the common and unsatisfactory problem to practicing urologists and most of the patients.

Principally, this study based on the use of 2 % formalin for intravesical instillation under vision via cystoscopy in 30 patients which had intractable hemorrhage from radiation cystitis.

Results after treatment with formalin revealed generally excellent control of hematuria. For 28 in 30 patients, the bleeding was stopped within 24 hours. The preoperative investigations and the procedure are simple, safe, spending short time without any serious complications. Finally, if the procedure was not successful we can proceed to bilateral cutaneous ureterostomy without any problems.

The Pubovaginal Sling in Stress Urinary Incontinence

W Kochakarn, U Rongruangsilp, S Leungwattanakij, K Ratana-olarn

After the introduction of Marshall-Marchetti and Krantz Urethropexy in 1949, there has been much improvement in the treatment of female stress urinary incontinence. Many modalities were developed via both transabdominal and transvaginal approaches. Transvaginal approach for stress incontinence seems more preferable among Urologists due to its less invasiveness and morbidity. Since the pubovaginal sling was introduced as the treatment of intrinsic sphincter deficiency (ISD), it is also now accepted in some institutes not only for the ISD but also for all types of stress incontinence. This study was designed to evaluate the operative technique as well as the outcomes of pubovaginal sling after a short period of practice in our institute.

Patients and Methods: Since September 1997 until March 1998, 22 patients of female stress urinary incontinence was treated with pubovaginal sling procedure. The mean patient age was 52.6 years old (range 34-73). The underlying causes of stress incontinence included: 19 of hypermobility of bladder neck and urethra, 1 after blunt trauma at the urethra, 1 after radiation for carcinoma of the cervix and 1 after urethral diverticulectomy. Eleven cases (50%) were in pre-manopausal period and 4 cases (18%) had no experience of vaginal deliveries. Ten cases (45%) were performed after the failure of other incontinence procedures (one Stamey's procedure and nine anterior colporrhaphies). Pre-operative cystogram, urodynamic studies, urine examination, cystoscopy and Bonny's stress test were done. No detrusor instability was detected in any cases. A strip of rectus sheath was harvested and used as sling in every case. Post-operative urinary drainage was done with urethral catheter.

Results: All of the 22 patients had uneventful post operative course. Mean hospital stay was 7.1 days (range 5-8 days). The mean urethral catheterization was 4.9 days (range 3-5 days). Eight cases (36%) had marked residual urine (>100 ml) and needed clean intermittent catheterization (CIC). The maximum CIC time was 1 month. The follow-up time was 3 - 9 months (mean 6.5) and showed that 21 cases (95.5%) had complete continence. Only one case (4.5%) after radiation had partially incontinence in the day time but need only 1 - 2 vaginal pads per day. One case (4.5%) showed de novo instability which subsided after six months post-operatively without the need of medication.

Conclusion: The pubovaginal sling can be applied for the treatment of female stress urinary incontinence of every type with low morbidity and high success rate.

Laparoscopic Urosurgery in Police General Hospital

A Santi-ngamkul, R Hakeem, S Phatcharatrakul, A Montamara, W Wachirapunyanukul, C Pruksapong

Laparoscopic approach is increasingly accepted as a new option in the field of Urology. Trans-peritoneal as well as extra-peritoneal approaches have been described in many operations. We performed the first case of laparoscopic ureterolithotomy in June 1997 by extra-peritoneal approach. Until now we have done altogether three cases of laparoscopic nephrectomy (one extra-peritoneal approach and two intra-peritoneally), two laparoscopic nephrolitho-tomy (extra-peritoneal approach), seven ureterolithotomy (extra-peritoenal approach), one laparoscopic pyeloplasty (intraperitoneal approach), three laparoscopic varicocelectomy (one intra and two extra-peritoneal approach), and four laparoscopic pelvic lymphadenectomy (extra-peritoneal approach). There is no

intra or post-operative mortality with very low post operative morbidity.

Preliminary Report of a Pubovaginal Sling Procedure Using A Bone Anchoring Device

S Leungwattanakij, K Ratana-Olarn, W Kochakarn

Right now pubovaginal sling procedure is one of the effective treatment for genuine stress urinary incontinence. The aim of this preliminary report is to evaluate the efficacy of the newest minimally invasive transvaginal sling procedure using a bone anchoring device with no abdominal incision as the conventional procedure.

Patients and Methods: In February 1998, a 50 year-old female patient of genuine stress urinary incontinence was treated with transvaginal sling procedure using a bone anchoring device with no abdominal incision. Preoperatively, lateral cystogram and urodynamic study were done to confirm the diagnosis.

The patient was placed in the lithotomy position under general anesthesia. A Foley catheter was inserted into the bladder and the balloon was inflated. The procedure deployed a bone anchor attached to a No. 1 Prolene thread directly into the pubic bone by an inserter transvaginally. Two anchors were inserted bilaterally on both sides of the urethra through the vaginal mucosa directly into the pubic bone. A tissue plane was created between the bone anchor sutures for the sling material using a right angle clamp. A 2×5 cm Decron graft was inserted into the tunnel and was sutured by the Prolene thread which previously attached to the bone anchor. The suture material was cystoscopically checked to confirm that it did not pass through into the bladder cavity. It was tied tightly while the cystoscopic sheath was still being inserted into the bladder. The small vaginal incision at the end of the tunnel was sutured by no. 2/0 Dexon. A vaseline gauze was packed into the vaginal canal. The Foley catheter was removed 4 days postoperatively.

Result: The procedure was successfully performed and no intraoperative and postoperative complications were noted up to 3 months follow-up. The patient was completely cured of stress incontinence. Stress test was performed postoperatively and revealed negative study.

Conclusion: The pubovaginal sling, using a bone anchoring device, is minimally invasive, safe and effective. However, longer follow-up for the recurrence and complications is mandatory.

Laparoscopic Renal Cyst Decortication

W Kamolpronwijit, C Varongchayakul

Laparoscopic surgery has involved in many fields of surgery due to less invasiveness, short recovery period, and better cosmetic result. In Urology many laparoscopic procedures were done such as laparoscopic high ligation, ureterolithotomy, nephrectomy, lymph node dissection, orchiectomy, pyeloplasty. In this paper we report 5 cases of laparoscopic renal cyst decortication, 2 cases were done at the same time with laparoscopic cholecystectomy. The results were good, less post-op pain medication. The patients were discharged from the hospital within a few days.

NEUROSURGERY

Does Nimodipine Improve Outcome in Early Surgery in Ruptured Intracraneal Aneurysm Patients ?

T Kolladareangkrai, M Sujatanond, M Luxsuwong, J Nimmannitya, C Tandhavadhana, S Nunta-aree, S Ladpli, N Tisavipat, V Chanyavanich

Background: Neurological deficits secondary to cerebral arterial vasospasm is well recognized as a major determinant of outcome in patients who suffered their initial subarachnoid hemorrhage. A wide variety of pharmacological agents and treatment protocols have been utilized in the management of vasospasm, most of which meet with either limited or no success. There was a thought that the calcium antagonist class of drugs might prove effective in preventing or reversing cerebral arterial vasospasm by using nimodipine.

Objectives: To study the efficacy of nimodipine in preventing neurological deficit from vasospasm and compare the cost-benefit and suitable dosage of nimodipine in early surgery in ruptured aneurysm patients.

Methods: Retrospective outcomes of 308 patients who had ruptured aneurysm at Siriraj Hospital between January 1987-December 1997 were studied. 73 patients were selected by randomization. 50 patients had early surgery betwen 24-72 hours after subarachnoid hemorrhage. Comparison of outcome was performed between 25 cases who received nimodipine and 25 cases who did not.

Results: Twenty three patients out of 25 nimodipine - treated patients had a favourable outcome at discharge compared to 7 patients out of 25 non-nimodipine patients. The 120 mg/day of nimodipine gave better results and less complications than other dosages in these patients.

Conclusion: Nimodipine treatment was associated with a significantly better outcome in early surgery of ruptured aneurysm patients and the effective dose was 120 mg/day.

Attitudes Toward Shaving for Cranial Neurological Surgery

S Ratanalert, H Sriplung

Background: Unshaved cranial neurological surgery has been successfully performed at Songkhlanagarind Hospital. In the Buddhist community, shaving is one of the traditional procedures for cleanliness and purification. The knowledge of social attitudes toward shaving is very important for the implementation of unshaved cranial neurological surgery in our society.

Design: Descriptive survey research was used.

Materials and Methods: The attitudes of shaving were surveyed in the communities of Songkhla Province. The responders were asked step-by-step following the designed questionnaire. The data was collected and analyzed.

Results: Of 1,128 responders, the female to male ratio was 3:2, their age was mostly under forty year-old and 91 per cent are Buddhist. Sixty per cent of the responders were in favor of shaving. After knowing the equivalent result of surgery either by shaved or unshaved method, the group favoring unshaved cranial surgery increased from 12 to 37 per cent. Statistic analysis, through ordinal and multinomial logic, identified the young age, female and more educated were the groups who preferred or ready to change their choice to unshaved method.

Conclusion: The unshaved craniotomy can be implemented in our society. Patients have a right not only to know the result of surgery but also to choose the preoperative preparation for their own scalp.

Results and Complications of Surgical Management of 29 Intracranial Aneurysms

K Chantra, S Khaoroptham

Thirty patients with a proven ruptured intracranial aneurysm were treated at our institution between February and November 1997. There were 12 males and 18 females 27 of them (29 aneurysms) underwent aneurysm clipping. The averaged interval from admission to operation was 2.04 days. At the time of discharge, there were 16 good results, 2 moderately disabilities, 6 severely disabilities, 1 vegetative state and 2 deaths according to Glasgow Outcome Scale (GOS).

Evaluation of Microvascular Decompression in Trigeminal Neuralgia

B Sahakitrungruang, Y Navalitloha

Fourteen patients were followed for an average of 57 months after 14 consecutive suboccipital craniectomies, and one suboccipital craniotomy for trigeminal neuralgia with microvascular decompression (MVD). Of all patients undergoing MVD, 11 (79%) had pain free relief, 3 (21%) experienced recurrent post operative neuralgic pain: in 1 (7%) had a major pain recurrence and two (14%) had minor pain recurrences. There was a significant relationship between and operative finding of vascular compression of the nerve and long-term complete pain relief in all patients. Posterior fossa exploration (craniotomy or craniectomy) is recommended as the procedure of choice for the patients with trigeminal neuralgia who are surgical candidates.

Keyword: Trigeminal neuralgia. Microvascular decompression. Trigeminal rhizotomy.

Acoustic Neurilemmoma with Contralateral Neurosensory Hearing Loss

E Khonsairaksakul

The author reports a case of right acoustic neurilemmoma presented with progressive neurosensory hearing loss on the left side for 6 months. The patient had also got vertigo symptom. The computer tomography of brain revealed the right cerebellopontine angle tumor, 2 cm diameter with erosion of the right internal acoustic canal. The left retrosigmoid suboccipital approach was done with completed tumor removal and preservation of the right CN VII and CN VIII. Immediate post operation, the left neurosensory hearing loss was improved but was decreased on the right.

Meningiomas of the Sellar Region: A Clinic-opathological Study

S Eksathien, Y Navalitloha, V Kasantikul

Region: A clinicopathological study.

Objective: To correlate the patholgoical aspects and the clinical manifestation.

Design: Retrospective study

Setting: Department of Surgery, Chulalongkorn Hospital

Materials and Methods: The clinical records of thirteen patients with meningioma of the sellar region between 1993 and 1996 and their histology were reviewed.

Result: There were 3 men and 10 women. The youngest patient was 3 years and the oldest one was 74 years old (mean 43 years). The duration of symptoms ranged from 1 month to 2 years (mean 9.8 months). Visual disturbance was the most common initial symptoms while hormonal abnormality was found in only one instance. There is no direct relationship between size of the tumor and the duration of symptoms. With the use of CT and MRI, we can detect the disease earlier. Most histological features of this kind of tumor are benign subtypes.

Conclusion: The prognosis of the patient depends on many factors including the preoperative condition, location and size of the tumor and the extent of surgery.

Key words: Meningioma, sellar turcica, visual acuity, visual field

Traumatic Basal Ganglia Hematoma (TBGH)

W Tirakotal, C Tandhavadhana, V Chanyavanich, S Ladpli, M Sujatanond

Eight patients suffering traumatic basal ganglia hematoma after closed head injury were reviewed. Traumatic basal ganglia hematoma was associated with other intracranial lesions in most cases. The outcome is categorized into two groups, those with fair outcome and those with poor outcome. Overall cognitive impairment and quality of recovery are more related to other primary brain damages.

Materials and Methods: We performed a retrospective analysis of one hundred head injured patients who were diagnosed to have traumatic intracranial hematoma at Siriraj Hospital from 1992 to 1998. Eight patients had hematoma in the basal ganglia. Case records of these patients are reviewed. Age, nature of injury, Glasgow coma score on admission, and motor deficits were noted. The outcome was evaluated at least 6 months after the injury and graded using the scale of Jennett and Bond.

Results: The causes of traumatic intracranial hematoma were vehicle accident in 61 per cent, assault accounted for 9 per cent, fall from height in 8 per cent and falling in 14 per cent. The patients' age range from 4 years to 82 years (mean of 37.8 years). Frontal lobe and temporal lobe were the most common two sites of intracerebral hematoma.

TBGH was found in 8 out of 100 patients. The Glasgow coma score on admission ranged from 4 to 5 (mean 4.6). Localized neurological dysfunction in the form of hemiparesis was seen in 4 patients (50%). Three patients had decerebrate rigidity.

Radiologic Features: Fracture of skull was present in 4 patients. Associated fracture of the long bones was present in one patient and one patient had mandibular fracture and C3-spine fracture.

Associated lesions detected on CT include intraventricular hemorrhage in 5 and extradural hematoma in 2 patients. Basal cistern or third ventricular obliteration was seen in 2 patients and associated with the poor outcome.

During admission 3 patients died. At 6 months, 3 were persistent vegetative state, one had moderate disability and one had good recovery.

Discussion: Six out of 8 TBGH patients in our study had the evidence of impaction on the frontal or temporal region. The proposed mechanism is shearing of the lenticulostriate or anterior choroidal blood vessels as a result of angular acceleration in the oblique or lateral axis.

Our findings contain useful points for assessing prognosis. There were 2 groups of patients. Those patients with isolated hematoma can expect a fair to good outcome, and patients with hematoma and CT evidence of additional primary brain damage are likely to be clinically worsening.

Gamma Knife Experience in An Inoperable Brainstem Tumor

P Songpaibool

An 8-year-old girl who suffered from increased intracranial pressure accompanied with diplopia was found to have a markedly enhancing mass in the periaqueductal gray, causing blockage of the cerebral aqueduct and massive hydrocephalus. After ventriculoperitoneal shunt implantation, the tumor which was absolutely inoperable was treated with Leksell Gamma Knife. The patient recovered completely and regression of the tumor was demonstrated in serial follow-up MRI of brain. Gamma Knife surgery should be considered the treatment of choice for inoperable brainstem tumors, that CT or MRI findings are suggestive of malignancy.

Outcome of Cervical Spine Injury

S Nilapong, S Saeheng, T Oeasakul, S Ratanalert, B Sripairojkul, N Phuenpathom

Ninety-five cervical spine-injured patients in PSU neurological surgery service were retrospectively reviewed. Mean age of the patients is 31 years and male is three times more common than female. Most of them are in the third and fourth decades of life. Traffic accident is the most common cause. More than half of the patients were referred from other hospitals. Physical examinations revealed complete neurological deficit in 40 and 30 per cent were normal. Frankel classification system was applied in 88 patients, most were grade A and E. Seven patients were not graded because of unconscious state. Upper cervical spine injury consisted of one quarter of all patients. Odontoid fracture was the most common upper cervical spine injury, followed by C_{1-2} subluxation. In lower cervical spine injury, more than half of them suffered from flexion injury. C_5 was commonly involved followed by C_4 and C_6. More than one third of the patients had other associated injuries and the most common was head injury. Surgery was performed in 40 patients. Posterior surgical approach was the most predominated surgical technique used, however, combined anterior and posterior approaches were done in 6 patients. Complications were detected in 42 patients. The most frequent complication was of infectious etiology. Results were defined by Frankel classification system. Mortality rate in our series was 23 per cent and all of these presented with Frankel grades A, B or coma. The patients presenting without neurological deficit remain unchanged. Outcome was associated with the initial Frankel grading in the remaining patients.

Intradural-extramedullary Cord Lesions at Songklanagarind Hospital

T Oeasakul, S Ratanalert, B Sripairojkul, N Phuenpathom, S Saeheng

The authors presented a retrospective analysis of 68 cases of intradural-extramedullary cord lesions which were operated upon between January 1985 and December 1997. There were 39 females and 29 males, aged 7 to 75 years old. The most common presenting symptom was motor involvement. Tumor locations were; cervical 25 patients, thoracic 38 patients, and lumbar 5 patients. Fifty-eight patients underwent myelogram and/or computed tomography (CT) scan, and ten patients underwent a MRI. The most common pathology was Schwannoma. Neurological impairment was divided into 4 groups. Before surgery, 42.5 per cent of the patients were included in groups I and II (mild neurological impairment) and 57.5 per cent of the patients were classified in groups III and IV (significant to severe neurological impairment up to paraplegia). After surgery, 84 per cent were categorized in groups I and II, and 16 per cent in groups III and IV. The early diagnosis of the disease appeared as the most relevant factor for improvement of the surgical result.

Endoscopic Third Ventriculostomy

B Sripairojkul, S Saeheng

We prospectively studied 8 patients who had an endoscopic third ventriculostomy performed between 1996 and 1997 in Songklanagarind Hospital. The surgical technique was described. Seven operations were successful and one operation failed. Success was found in cases of pure aqueductal stenosis, aqueductal stenmosis with Dandy Walker malformation, and posterior fossa tumor.

In patient where an endoscopic third ventriculostomy failed, he had aqueductal stenosis with marked hydrocephalus. Marked dilation of the third ventricle could compress the aqueduct of Sylvius. Although they were communicating hydrocephalus, it looked like non-communicating hydrocephalus. To avoid a valvular shunting complication, we suggest performing of an endoscopic third ventriculostomy in selected non-communicating hydrocephalus patients.

PLASTIC RECONSTRUCTIVE SURGERY

Total Ear Reconstruction

V Chichareon, N Donsakul

Total ear reconstruction by using autogenous cartilage framework is the treatment of choice for microtia. The rib cartilage provides the most substantial source for fabricating a total ear framework. The advantage of using autogenous rib cartilage framework compared with silicone in patients with microtia is the increased ability to withstand trauma, and the increased durability of reconstructed ear.

Ten cases of total ear reconstruction in Songkla-nagarind Hospital, Faculty of Medicine, Prince of Songkla University were reviewed retrospectively. Three stages of total ear reconstruction are presented to stimulate the plastic and reconstructive surgeons to use the autogenous tissue instead of alloplastic material. The secret of success is the costal cartilage framework which can be carved carefully to creat the detail of helix and antihelix in the first stage. The contour, detail and position of cartilage framework should be corrected or readjusted before finishing the operation. If the contour and position of the framework after 1st stage reconstruction are not satisfactory, reoperation should be performed immediately.

Delayed Extended Tensor Fasciae Latae for Reconstruction of Large Abdominal Wall Defect

W Tekasap

Problem: Because of forming the barrier wall for several vital organs, local incompetence or breakdown of the abdominal wall may become life-threatening by interfering with vital functions (aid in vomiting, coughing and support normal respiration etc.). The abdominal wall defect must be closed as quickly as possible with healthy tissues that base on the priorities in abdominal wall reconstruction (wound coverage, protection of the visceral organs, fascial support, muscle function and esthatics). If not, the visceral organs will expose to the environment and result in fistula of the bowel and the defect of other functions of the abdominal wall. The healthy tissue must be selected to close the defect.

Research Question: The tensor fasciae latae was among the well known donor muscles for musculocutaneous flap, and it was used extensively in a variety of clinical situations. Because of its strength and thickness, the tensor fasciae latae was a preferred choice for reconstruction of the lower abdominal wall and inguinal defects but it was not suitable for the upper

abdominal wall defect. Consequently, the delayed extended flap was elevated to close the upper and lower abdominal wall defect.

Setting: The flap was applied in a 35 year-old Thai male with abdominal wall dehiscence after abdominal laparotomy because of traffic accident at Plastic Surgery unit of Phramongkutklao Hospital.

Results: The defect was closed completely and healthy. The graft at doner defect completely healed.

Conclusion: The tenser fasciae latae can be used to cover not only the lower but also the upper abdominal wall defects. In that case, the flap must be delayed and extended.

Percutaneous Zygomatic Arch Rigid Fixation in Zygomatic or Midface Fractures via Preauricular Incision

K Sirirak

Collapse of zygomatic arch following trauma leads to inadequate anteroposterior projection of zygomatic body and increase in facial width, especially in comminuted zygomatic or midface fracture. Displaced zygomatic fractures require careful assessment and meticulous open reduction and rigid fixation. Accurate assessment of the position of the zygomatic arch in relation to cranial base posteriorly and zygomatic body anteriorly is the key to accurate repair of the zygoma and midface. The whole zygomatic arch can be exposed via subcillary incision, lateral upper blepharoplasty incision and preauricular incision and the whole zygomatic body may be exposed if upper buccal sulcus incision is added. The zygomatic body and arch were exposed and brought to anatomical correction by rigid fixation with miniplates and screws, using percutaneous method on zygomatic arch. To improve the results in the reconstruction of outer facial frame and function following zygomatic and midface fractures, 17 cases of comminuted zygomatic fractures and 8 cases of comminuted midface fractures were treated using this technique in the year 1997. This technique is easy and no need to traditional hemicoronal incision. They all had short hospitalization. In conclusion, this technique is justified in-patients with comminuted zygomatic or midface fractures.

Key word: Zygomatic arch, rigid fixation

Reconstruction of the Major Midface Soft Tissue Defect in the Problem Cases

M Viwathanasittiphong

Problem/background: Post traumatic, infective and ablative defect in the midface region was the challenge for reconstruction in order to get the best results. To achieve the successful outcome; we must consider the underlying tissue bed, how many layers to be reconstructed, color and texture of the reconstructed tissue compared to adjacent tissue, possible restoration of the previous function.

Objective: To present and review the systematized reconstruction of the nose, upper lip, cheek defects in the problem cases.

Design: Cases review and review article

Results:

Case 1: Post traumatic nasal and cheek defects resulted from shearing force collision and deep burn. Staged scalping flap for subtotal nasal reconstruction with augmentation by conchal cartilaginous and rib graft, expanded cervicopectoral flap, STSG from scalp were used to solve this problem.

Case 2: Cancrum oris resulted in loss of the columella, distal nasal septum, full thickness of upper lip and scar of adjacent cheek. This difficult defect was reconstructed by dorsalis pedis free flap and augmented rib graft.

Case 3: The patient underwent wide excision of through and through SCC buccal mucosa. The full thickness defect of cheek was reconstructed by cervicofacial and tongue flap.

Conclusion: The reconstructive tools such as skin graft, local flap, regional flap, expanded flap with tissue expansion, free flap could be used according to the appropriate condition in each patient. Three cases in the presentation had different problems of reconstruction. The way to obtain the best outcome, we must consider the defects carefully to match the reconstructive method in each problem case.

Alternative Method of Treatment of Recurrent Temperomandibular Joint Dislocation

W Chatutong, C Sajja-isariyawut, S Mekruksavanich, P Manurangsi

Treatment of recurrent tempero-mandibular joint has a lot of variety of technique.

Plastic unit, Lerdsin Hospital reports a technique which is simple, less invasive and satisfactory result by using screw to limit anterior translocation of condyle.

The authors presents 2 patients treated with this technique. The result is satisfactory with one year follow-up period.

Thenar Split-Thickness Skin Graft for Hand Reconstruction: A New Donor Site

A Kruavit, V Visuthikosol

The esthetic appearance of grafted skin on the volor surface of the hand is frequently unsatisfactory, particularly when the graft is harvested from the groin or the thigh. Its hyperpigmentation at the recipient site has become an evident stigma to the patient's hand and may be completely unacceptable. Hypothenar split-thickness skin grafts has long been reported to provide an excellent method of reconstruction of small hand defects and finger tip injuries, but its disadvantage is a limited donor area.

Thenar split-thickness skin grafts were used to recon-

struct 28 hand defects. The results were evaluated for healing process, esthetic appearance, durability of both donor and recipient sites, grasping mechanism, and sensory return. They were also compared to the use of 36 hypothenar split-thickness skin grafts. Combined thenar and hypothenar split-thickness skin grafts also provide satisfactory results in reconstruction of more extensive hand defects in 16 patients.

All 28 recipient sites had acceptable esthetic appearance with no hyperpigmentation on the volar surfaces but they looked hypopigmented on the dorsum of the hand and digits. All donor sites had inconspicuous or unnoticeable scars. Grasping mechanism was normal in all. Fifteen patients had light touch evaluation and they felt the same number of light touch stimuli on the grafted skin as on the normal skin. Two-point discrimination (2PD) was evaluated in 15 patients. Ten patients had normal 2PD, while the rest had fair 2PD. No ulcers developed either at the recipient sites or donor sites. The overall results of thenar split-thickness skin grafts were as good as the hypothenar split-thickness skin grafts, but a bigger piece of split-thickness skin graft could be harvested from the thenar area. As far as the color match is concerned, both of them were excellent donor sites for reconstruction of palmar defect of the hand, but they looked hypopigmented on the dorsum.

Thenar area is recommended for a new expendable donor site of split-thickness skin graft for hand reconstruction especially on the volar surface not only for the Thai but also for all Orientals. For more extensive hand defect, combined thenar and hypothenar split-thickness skin graft can help solve this problem.

ORTHOPEDIC SURGERY

The Relationship Between Foot Length and the Inter Anterior Superior Iliac Distance: An Anthropometric Study in Thais

S Waikakul, V Vanadurongwan, S Sakarnkosol

Background: Reduction of unstable fracture pelvis by external fixation might be over or under corrected as there is no proper estimation from the surgical landmark.

Aim of Investigation: To find out a proper guide by normal surgical landmark for pelvic reduction in emergency condition.

Methods: A survey research was carried out in 600 volunteers aged from 10 to 70 years. Simple caliper and tape were used to measure the height, foot length and inter anterior superior iliac spine distance.

Results: In 376/420 male volunteers (89%), the length between right heel and tip of the fourth toe was equal to the inter anterior superior iliac spine distance. In 173/180 female volunteers (96%), the length between right heel and tip of big toe was equal to the inter anterior superior iliac spine distance.

Conclusion: The length of the right foot can be used as a reference in reducing unstable pelvic fractures.