

## Abstracts

# 25th Annual Congress of the Royal College of Surgeons of Thailand, July 2000

### PLASTIC RECONSTRUCTION

#### **The Use of Latissimus Dorsi Muscle Flap to Repair Large Diaphragmatic Defect**

*C Aojanepong*

There are many methods described for the repair of diaphragmatic defect including repositioning of the diaphragmatic remnant, the use of lower chest wall, prerenal fascia, fascial graft, synthetic materials, abdominal wall muscle flap and the "reverse" latissimus dorsi muscle flap. For the large defect after resection of malignant tumor of the diaphragm which requires adjunctive radiation therapy, vascularized autologous tissue is preferred. The "direct innervated" latissimus dorsi muscle flap was successfully employed to repair large diaphragmatic defect in a patient who had a rare malignant small cell tumor or Askin's tumor of diaphragm. The direct elevation of the latissimus dorsi muscle maintains its innervation and main blood supply comparing to the "reverse" fashion. The neodiaphragm is functioning well five months after surgery and adjunctive radiation therapy. There are no paradoxical movements or complications. The result is encouraging longterm follow-up is needed to determine the eventual fate.

#### **Technique of Tissue Expansion for Head and Neck Reconstruction at Ramathibodi Hospital**

*A Kruavit, V Visuthikosol*

Tissue expansion has been an established method of reconstruction providing ideal tissue replacement with minimal scarring and minimal donor site morbidity for more than 20 years. We have modified the technique of tissue expansion performed at Ramathibodi Hospital since 1986 to solve the economic problem of the patients.

We present the techniques of using expanders for

head and neck reconstruction in 28 patients during 1986-1999. Since some patients cannot afford to buy a new silicone tissue expander which costs about 18,000 Baht each, we solve this problem by reusing the expander after autoclaving sterilization. The number and shape of tissue expanders (remote valve system) are determined by the size, shape, and location of the defect and the donor tissue. It is not practical for us to use custom-made expanders which can be designed to fit unusual defect sizes and shapes as they are more expensive and may delay the procedure because of manufacturing concerns. We have to use the imported tissue expanders of different sizes and shapes that are commercially available in our country. Rectangular shape tissue expanders of different sizes are commonly used for head and neck reconstruction.

The techniques can be divided at least in two stages. In the first stage, 1-3 tissue expanders are used depending on the sizes of the defect. We prefer inserting the expander(s) under the skin within the subcutaneous fat over the preauricular fascia, cheek, and neck; under the galea aponeurotica of the scalp; and under the frontalis muscle of the forehead. The incision is made adjacent to the defect as close as possible. The longer the incision is the chance of wound dehiscence and exposure of the expander. The dissected pocket should be 1-2 cm larger than the width and length of the expander to permit the expander to lie comfortably in a flattened position. If multiple expanders are required we will create a single pocket for all expanders to prevent septae formation of pseudosheath among them. The injection port (reservoir) is tunneled away from the expander and the incision site. A vacuum suction drain is always used to prevent hematoma formation. Following wound closure, the expander is partially inflated with normal saline solution to reduce dead space, reduce bleeding, and maintain the pocket size. Removal of all

sutures was done in two weeks time, then serial injection with normal saline solution begins. The injection process is carried out under a sterile condition. A number 25 needle is preferred for injection to avoid subsequent leakage of the reservoir and care should be taken not to puncture the expander so that it can be reuse again and again. The volume of normal saline injected at each session depends on the skin perfusion color of the expander area. If it is pale with no capillary refill at all after waiting for half an hour, some normal saline solution will be withdrawn until capillary refill returns. The inflation proceeds regularly 2-3 times a week until adequate volume of expansion is achieved, normally requires about 6-8 weeks of expansion.

In the second stage, the expander(s) is (are) removed and the expanded skin or scalp is rotated, advanced or dissected as an island flap to cover the defect. In addition, capsulectomy and limited capsulotomy are helpful to unfurl the expanded flap. However, reexpansion with the same expander(s) can be immediately performed if the defect is too big and the expanded skin or scalp can not cover the whole defect at one time.

The over all results have been very satisfactory despite having some minor complications eg. minor wound infection, partial wound disruption. We would therefore recommend this technique for reconstruction not only head and neck area but also other areas of the body to save the patient's money and foreign currency.

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### Clinical use of Vacuum Assisted Closure (VAC) for Wound Dressing

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*J Sadawongwiwat, N Kanoksunthornvat, V Srimuninnimit, K Jalapong*

**Objective:** VAC is a newly developed wound dressing technique in the recent years, which can solve many difficult wound management problem effectively, by decrease wound bacterial accumulation and increase wound healing process from increase vascularity and mitotic activity. But the recommended technique needs expensive commercial imported equipments which are unaffordable in Thailand. We have made a study to compare the material property of the VAC foam and local-made cheaper foam. Then, another clinical study was conducted to compare the wound healing rate between our cheaper vacuum dressing and wet dressing, and to compare the vacuum wound healing rate between different type of patient and wound.

**Material and Methods:** All the studied wounds were collected from Ramathibodi Plastic Service admitted patients from June 1999 - Jan 2000. Forty three problem wounds from 31 patients were studied. Dressing was applied

to all wounds in 2 types (VAC = test-group = 26, Wet = control-group = 17) in non-randomized pattern (VAC in 1st half phase, Wet in 2nd half phase) with dressing duration ranging from 1-10 wks. Measurement of surface area and cavity volume was done to every studied wound at 2-7 days internal to compare healing rate between: each type of dressing (Wet and VAC), each week of vacuum application (1st-10th wk), and each status of patient and wound.

**Results:** Chemical structure of both compared foam is the same. But physical property of the cheaper foam tends to be easily obstructed by wound discharge. Statistical analysis for wound dimension changing was performed by Student T-test, Chi-square test and Mann-Whitney U test. The data showed that vacuum healing rate surpassed wet dressing healing rate significantly in the 1st-3rd weeks. Healing effect of vacuum is better in non-DM patient and acute traumatic wound. Age, Sex and infected organism have no effect to Vacuum healing rate.

**Conclusion:** VAC technique provides better and quicker result for wound healing with easier wound care. It can be used with cheaper material with good clinical result, and has better result if use in the selected patient and wound.

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### A Prospective Trial Comparing Chitin Sheet with Tulle-gras in the Healing of Split Thickness Skin Graft Donor Sites

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*S Numhom, K Kongsuwan, M Prasitsilp, V Srimuninnimit*

Background: Split thickness skin graft donor sites have been dressed with a wide variety of materials ranging from nothing to synthetic skin substitutes. The most widely-used dressing, traditionally, has been tulle-gras overlaid with layers of gauze and bandage. Difficulties encountered with this dressing include significant adhesion to the wound and shearing of the new epithelium while removing the dressing. Chitin and its derivatives have been proposed for several biomedical applications because of their excellent biocompatibility and abundance in nature. Chitin has been found to have an acceleratory effect on the wound healing process, a rapid hemostatic property and a hydrogel formed at the wound interface. This is to ensure there would be no damage to the newly regenerated epithelium.

**Materials and Methods:** Twenty-one patients undergoing split thickness skin-grafting procedures were prospectively studied. The split-thickness graft was harvested from anterior aspect of the thigh, at the depth ranging 0.012-0.015 inch. The convention dressing consisted of a 10x10 cm pad of tulle-gras. The trial dressing consisted of

a 10x10cm pad of chitin mesh sheet. Following the graft harvested, half of wound was covered with chitin sheet and half with tulle-gras randomized between the proximal and distal areas of the wound. The dressing was removed on the tenth day when the donor site was photographed. The assessment was made of the extent of complete healing of both donor sites area in percentage.

**Results:** This trial evaluation was carried out on 21 patients, 11 males and 10 females, whose ages range from 26 to 77 years. Ninety nine per cent of wounds dressed with chitin sheet and 96 per cent of wounds dressed with tulle-gras were completely healed in ten days. A pair, two-tailed, student's t test was used for statistical analysis. The results showed that chitin sheet was significantly better than tulle-gras in the healing of split-thickness skin graft donor sites ( $P=0.006$ ).

**Conclusion:** The results of our study showed the usefulness of chitin sheet as a donor site dressing as it promotes relatively rapid healing. Moreover, chitin is easy-to-use and inexpensive. Chitin sheet, consequently, should be widely recommended as new option for wound dressing in the years to come.

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### **Reconstruction of the Full Thickness Upper Eyelid Defect by Transpositioning of a Paralyzed Frontalis Muscle and Full Thickness Skin Graft**

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*K Wattanawong*

A 39-year-old woman sustained a car accident. The pertinent findings were a full-thickness left upper eyelid defect and a comminuted fracture of the left orbitozygomatic complex with bone and soft tissue loss. The left frontalis muscle was paralyzed owing to an injury to the frontal branch of the fascial nerve. The eye globe was not severed.

**Operative** plans were a reconstruction of bone and soft tissue defects and a coverage of the exposed cornea by a full-thickness upper eyelid reconstruction.

Using an iliac bone graft to reconstruct the orbitozygomatic complex and covering with a transposed temporalis muscle and a full-thickness skin graft from a supraclavicular area were carried out. Because of a severe damage of the adjacent skin, therefore, the use of local skin flap was not technically feasible. The lower part of the frontalis muscle, which was completely paralyzed, was transposed to cover the cornea and used as nutrient blood supply for both a palatal graft, as an inner lining and a framework, and a full-thickness skin graft, as an outer lining.

The palatal mucosal graft alone could substitutes functions of both conjunctiva and tarsal plate, as an inner

lining and support, from previous studies.

The result was satisfactory and the cornea was well protected but the consequences were lower eyelid ectropion, unsightly facial scar, and ptosis of the upper eyelid.

To improve the cosmetic outcome, scar revision and a suspension of upper eyelid were performed sequentially.

In conclusion, a method of using non-functioned frontalis muscle for an upper eyelid reconstruction, which is reliable and uncomplicated, should be considered as an alternative in a case with unavailable local skin flap and severe damage of frontal branch of a facial nerve.

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### **To Resurface the Severe Degloving Hand by Fascial Free Flap**

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*M Vivathanasittiphong*

A 17-year-old Thai male was injured by plastic pumping machine to his right hand. He presented with degloved hand involving four ulnar digits from middorsum to fingertip dorsally and palmodigital line to fingertip ventrally. It revealed exposed tendons and neurovascular bundles of the involved digits. No fracture or dislocation was seen. The main problem to be resolved is how to resurface this open wound in order to get early physical therapy. Because the stiffness of these small joints will occur if it takes a long time to resurface. So the temporo-parietal fascial free flap was selected to solve this problem. Double microvascular anastomosis were made to both arteries and veins at the snuff box region to reassure the reliable perfusion. The size of this flap was about 20 x 15 cm<sup>2</sup>. The vascularized fascia was covered by stage intraoperatively. After 3 weeks, this iatrogenic syndactyly was separated to create interdigital web and free the fingers. The patients was reinforced to have early physical therapy. Both durable coverage and function of this reconstructed had were acceptabel.

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### **Pre-arterialization of Arterialized Venous Flap**

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*B Wungcharoen, P Thirakhuft, Y Santidhananon, N Sermsiltham, K Kaewchijaroenkit, C Kolkijkovin*

Many factors for optimal survival of arterialized venous flap have been elucidated experimentally and clinically. However, varying degrees of necrosis in larger arterialized venous flap remain unsolved. In experimental animals, viability of arterialized venous flap could be achieved by pre-form arteriovenous fistula at the donor site.

We treated eight patients, over a 3-year-period from June 1997 to January 2000, who had skin defects around the

extremities with arterialized venous flaps which were pre-arterialized for at least two weeks at the donor sites. Pre-arterialization was created at the donor site by arteriovenous shunting. The donor sites were either the non-dominant forearm (five cases) or the medial lower leg (three cases) of the patients. The flaps size was ranging between 4x4 cm and 9x10 cm. The flap survival was between 93 and 100 per cent by digitalized scanning. Pre-arterialization led to easier flap design intraoperatively by the noticeable dilated superficial vein. In addition to advantages of the arterialized venous flaps, pre-arterialization did not hinder the hospital course of the patients. The disadvantage of two-stage operation could be balanced by appropriate selection of cases.

### Comparison of Op-site, Polyvinyl Chloride and Tulle Gauze in the Treatment of Skin Graft Donor Site

*T Poonyakariyagorn, W Sirimaharach, A Angspatt, O Pinchai*

**Background:** Split thickness skin graft is a frequently used reconstructive technique. While the knowledge of wound healing is advanced, there is currently no consensus about the optimal donor site dressing.

**Objective:** To compare between Polyvinyl chloride film (PVC film), Op-site and tulle gauze in the care of skin graft donor site.

**Setting:** Department of Surgery, King Chulalongkorn Memorial Hospital and Department of Surgery, Chiangmai University Hospital.

**Material and Method:** From October 1998 to January 2000, 81 donor sites in the same number of patients were treated by three different methods; tulle gauze, Op-site and PVC film. Each wound was followed until it was completely healed and visual analogue scale was used for pain evaluation.

**Results:** Donor site dressed with PVC film had a healing time of 10.44 days which was not different from Op-site (10.54 day) but significantly faster ( $p < 0.001$ ) than tulle gauze (17.84 day). Pain of donor sites of PVC film (1.48) was not different from Op-site (1.34) but significantly less than ( $p < 0.001$ ) tulle gauze (5.45). There was no difference in infection among each group.

**Conclusion:** We found no difference between Op-site and PVC film in healing time and pain. Both of them were better than tulle gauze. The results demonstrate the usefulness of PVC film as a donor site dressing as it promises relative rapid healing and also is inexpensive.

## NEUROSURGERY

### A New Concept for the Surgical Treatment of Retrochiasmatic Craniopharyngioma

*S Nunta-aree, A Hakuba*

**Objective:** Almost all neurosurgeons select pterional, transcallosal or translamina approaches for retrochiasmatic craniopharyngioma. We studied the embryology of telencephalon and applied the results to operate on a retrochiasmatic craniopharyngioma by transpetrosal approach. Advantage of transpetrosal approach base on the present research, physiological knowledge and long-term follow up are pointed out.

**Place and Time of research:** Embryological research was done at Kyoto University during 1998-1999. Retrochiasmatic craniopharyngiomas were operated by transpetrosal approaches at Osaka City University and Siriraj Hospitals.

**Materials and Methods:** 14 human embryos range from stage 11 to 21 were examined under microscope and reconstructed by 3 dimensional computer graphic

technique. Ontogeny of various telencephalic structures were studied.

**Results:** 1) The rarity of early human embryo and lack of modern technique make the embryology of telencephalon described in the classic literature unclear. The present study shows the basal and alar plates are existing in the telencephalon. The septal area, the basal cholinergic nuclei, the preoptic area and the globus pallidus develop from telencephalic basal plate. All other telencephalic structures develop from telencephalic alar plate.

2) In general, the best neurosurgical approach is the direct approach to the lesion without passing through other compartment. The approach should not pass through the basal plate as it makes worse neurological deficit than passing through the alar plate.

3) The pterional approach for large retrochiasmatic craniopharyngioma is rarely successful. The chiasma hinders vision to the tumor. The ventral surface of chiasma where the tumor maximally adhered is hardly seen. The

ICA is on the way to the tumor and make surgical window smaller.

4) The retrochiasmatic craniopharyngioma is an extra-axial or third ventricular (diencephalon) tumor. It is not reasonable to cut the lamina terminalis and third ventricular floor by translamina approach to expose an extra-axial tumor. It is also improper to cut the lamina terminalis (telencephalon) to access the third ventricular (diencephalon) tumor. The septal area and the basal cholinergic nuclei (basal plate) are retracted during translamina approach. Cutting the corpus callosum (telencephalon) to expose an extra-axial or third ventricular (diencephalon) tumor is unwise. It is also a risk to the fornix and memory loss.

5) The transpetrosal approach gives a very basal approach. By looking upward from the drilled mastoid, the ventral surface of the chiasma and the hypothalamus which the tumor maximally adhered are best seen with a better chance of total removal. This is proved by our lowest incidence of delay recurrence. The extra-axial tumor can be exposed without cutting any brain. The third ventricular tumor can be exposed directly through the third ventricular floor and is harmless to the memory.

**Summary:** Transpetrosal is a good alternative for retrochiasmatic craniopharyngioma.

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#### **Experimental Study of Thai Red Cross Fibrin Glue in Various Thrombin Concentrations for Sealant of Small Dural Defect: In-vitro and In-vivo**

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*A Boongird, T Janwityanuji*

**Objective:** To study the sealant effect of local-made fibrin glue and to compare its sealant effect in various thrombin concentrations

**Study Design:** The experimental studies were divided into two parts; one was an in-vitro study of small dural defect sealing property under 20 and 30 cmH<sub>2</sub>O pressure, the other was an in-vivo study of the glue property in 8 Wistar rats with small spinal dural defects.

**Results:** The in-vitro study of fibrin glue in various thrombin concentrations and definite sealant effects were compared with the control group. The rates of leakage in three concentrations were not different. In in-vivo study, the sealant effects of fibrin glue for small spinal dural defects were clearly demonstrated at 24 and 48 hours of post operative periods. The leakage test under 20, 30 and above 30 cmH<sub>2</sub>O were performed to compare between the control group and each group of different thrombin concentrations. All fibrin glue clotting times were about 10 seconds despite different thrombin concentrations. The

histopathology of the small dural defect with 50 iu fibrin glue sealant at 48 hrs was shown to prove its sealant effect.

**Conclusion:** This study suggests that the Thai Red Cross fibrin glue has the desired sealant effect. The best thrombin concentration for small dural defect sealant should be further investigated. On the basis of the available results of this study, the authors recommend that the 50 iu/ml fibrin glue is practically useful enough as an adjuvant for prevention of CSF leakage through the small dural defect. We strongly believe that the surgical technique of repairing dural defect and the control of intracranial pressure are still the mainstay for prevention of CSF leakage in any dural defect.

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#### **Multimodality Treatment of Cerebral Arteriovenous Malformation: Combined Endovascular Embolization and Surgical Excision**

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*V Chanyavanich, A Churoj, P Chiewvit, S Suthipongchai*

Review was made of three hundred twenty six cases of Arteriovenous Malformation treated at Siriraj Hospital during period 1989-2000 using combined glue embolization and microsurgical excision of cerebral arteriovenous malformation. Study design is to evaluate bleeding risk in correlation with size and draining vein of AVM and its natural history together with outcome of each groups of patients. There were 210 males and 114 females with average follow-up period of 24 to 8 years.

**Methods:** Patients were given the choice of surgery and embolization when small size and superficial draining veins were considered as favorable. Large AVM and deep draining veins will be submitted to multiple embolizations with the aims to reduce venous hypertension, flow and feeding arteries into the nidus prior to surgical excision.

**Results:**

1. Periventricular AVM and intranidal aneurysm constituent risks of rebleeding.

2. Eight patients bled and died without surgery and 6 patients died after emergency surgery. Six patients died after suffering prolonged unconsciousness in vegetative state. The overall management mortality and morbidity was 6 per cent, perioroperative mortality of 1.84 per cent.

3. Forty per cent of patients had embolization alone. Forty three per cent had surgery alone and 13 per cent had combined embolization and surgery. Four per cent had embolization and radiosurgery. One patient with complete angiographic obliteration of AVM presented symptoms at eight years follow up and on microsurgical excision minute residual AVMs were noted around the bloc of glue.

## PEDIATRICS SURGERY

### Accuracy of Silk Sign in Diagnosis of Patent Processus Vaginalis

*A Mungnirandr, T Kunapensiri, D Meekaewkunchorn, R Ruangtrakool, S Sangkhathat, M Lauhapensang*

**Background:** Inguinal hernia is one of the most common pediatric surgical conditions. Because history in paediatric patient may be unreliable, physical examination is helpful in detecting inguinal hernia or patent processus vaginalis. Silk sign is physical examination in detecting patent processus vaginalis. So we test for accuracy of silk sign in our hospital.

**Method:** Patient age 0-12 years: 40 patients that have definite diagnosis of indirect inguinal hernia from history and physical examination was tested by 4 residents of paediatric surgery who did not know these patients. The silk sign was performed by palpation of spermatic cord against pubic tubercle. Positive for silk sign is the sensation of thicken spermatic cord or sensation of a sac. The results was recorded and checked for accuracy.

**Results:** In 40 patients, silk sign was tested for 60 times. There were 57 times in 60 times that positive silk sign was detected for the side that are true hernia, the correct examination was 95 per cent.

**Conclusion:** The high accuracy of silk sign is benefit for patients who have uncertain history and have no inguinal mass at the presentation of inguinal hernia. Another benefit is helping in making decision for contralateral groin exploration in children that present with unilateral inguinal hernia.

### An Appraisal of Venous Access for Parenteral Nutrition in Pediatric Surgical Patient

*S Sangkhathat, T Kunapensiri, D Meekaewkunchorn, A Mungnirund*

**Objectives:** Central venous catheterization is indicated in some of infants and neonates undergoing major abdominal surgery. To establish and care for a central line in small neonates is not without difficulty. The study is aimed to evaluate the efficacy and problems of various types of central venous catheter used in pediatric surgical patients.

**Setting:** Pediatric surgical intensive care unit, Division of pediatric surgery, Siriraj Hospital.

**Design:** Prospective analytic study.

**Patients and methods:** Over a thirteen-month periods,

49 central lines were inserted for 32 patients in the intensive care unit of pediatric surgical department. Data regarding weight, diagnosis, type and insertion method of central catheters, reason of removal and catheter longevity had been collected prospectively. Analysis was separately done for each group of (1) silastic tube, surgically inserted via external or internal jugular vein (23 lines), (2) silastic tube inserted via brachiocephalic or saphenous vein (12 lines), (3) commercially prepared Broviac type catheter with Dacron cuff (Cook's) (4 lines), and (4) percutaneous major vein cannulation (10 lines).

**Results:** Average longevity of each group were 11.0, 4.33, 70.0 and 6.5 days, respectively. Incidence of infection was highest in the group of silicone tube inserted into the arm or groin veins (1 per 5.0 catheter-days) and lowest in Cook's catheter group (1 per 88.5 catheter days). Incidence of dislodge-migration was also highest in the arm and groin veins group and lowest in Cook's catheter group. The most common reason for premature removal of catheter are suspicion of catheter related sepsis (36.7%) and dislodge-migration (30.6%). The most common identified organisms were Candida species and coagulase negative Staphylococcus aureus.

**Conclusions:** We concluded that silastic catheter placing via jugular veins is appropriate for venous access in the surgical neonates and percutaneous central line placement is an alternative choice for older infants. Data also suggested that efficacy of central line can be improved by means of infection and dislodgment prevention.

### Transanal One Stage Endorectal Pull-through for Infants with Hirschsprung's Disease

*S Teeraratkul, S Worapongpaiboon*

**Purpose:** The aim of the study is to present the technique and results of a one stage repair of Hirschsprung disease using a transanal endorectal pull through technique that eliminates the need for intraabdominal exploration.

**Methods:** Six children age 1-25 months with biopsy proven Hirschsprung' Disease underwent transanal endorectal pull through procedure during 18 months period. The rectosigmoid transitional zone was suggested by contrast barium enema in all patients. A full thickness rectal biopsy was performed 0.5 cm above dentate line extending 1.5-2.5 cm upward before the definitive operation. A rectal mucosectomy was performed starting at 0.5 cm proximal to the dentate line after the pathological report confirming

aganglionic rectal biopsy. Transanal mucosectomy was dissected proximal to the level of intraperitoneal rectum. The rectal mucosa and muscular sleeve were pulled out through the anus. The intraperitoneal colon was intussuscepted into the inverted rectal cuff. The muscular sleeve was divided circumferentially to allow full thickness mobilization of the rectosigmoid colon. Transanal traction and dissection permit direct visualization and division of mesenteric vessels close to the colonic serosa. The proximal extent of dissection was delineated by the presence of ganglion cells seen on frozen section analysis. Aganglionic bowel was resected and ganglionic colon was anastomosed to rectal mucosa. One penrose drain was inserted between the pull through colon and rectal cuff.

**Results:** The operative time was 60-95 minutes excluding period of waiting for frozen section. The procedure permitted resection of the sigmoid colon up to the lower part of descending colon. The average length of resected colon was 13 cm (ranging 12 to 17 cm). Postoperative hospital stay was 3-4 days. Oral intake could be given to all patients in 2 days after operation. All children averaged 3-7 bowel movements per day during first week (mean 4 times) and return to normal (1-3 times a day) three weeks after operation. Rectal examination routinely performed three weeks after operation demonstrated no anastomotic stricture in all cases. Median follow up was 11 months (range 4-25 months). Long term follow up showed excellent clinical results. There were no enterocolitis, constipation or anastomotic stricture during the follow-up period.

**Conclusion:** One-stage transanal endorectal pull through for Hirschsprung's disease can be performed without opening abdominal wall or intraabdominal dissection. The procedure should be considered in the patient with definite transitional lesion suggested by barium enema. The benefits of this approach results in early postoperative feeding, early hospital discharge and no visible scar.

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### **A Rare Cause of Omphalocele: Epigastric Heteropagus**

*D Meekaewkunchorn, P Suthiwan*

Incomplete conjoined twinning or heteropagus attached at the autosite's epigastrium is an extremely rare form of conjoined twinnings.

At present, etiology of omphalocele is not clear but most researchers ascribe to the original theory of Duhamel which holds omphalocele results from failure of the lateral body wall folds to close, whether the primary event is failure of body wall closure or failure of the midgut to return to the

abdominal cavity.

We report a case of epigastric parasitic twinning with omphalocele in which content of omphalocele sac is organ of the parasitic twin. Thus we think this may cause failure of lateral body wall folds to close in embryonic life and then omphalocele become.

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### **Hendren's Posterior Myectomy with V-flap and Anterior Z-plasty for Low Anorectal Malformations: A-ten-years-Experience**

*S Patrapinyokul, S Sakthath Na Ayudhya, K Thadyathikorn*

Fifty patients with low Anorectal Malformations had been treated at Prince of Songkla Hospital between January 1989 and December 1999. Twenty nine patients were female who had anovestibular fistula (17), anoperineal fistula (10) and no fistula (2). Twenty one patients were male with perineal fistula (10), anal stenosis (2), scrotal fistula (3) and no fistula (6). The majority of patients (74%) had posterior myectomy and local V-shaped skin flap as described by Hendren with or without anterior Z plasty. Other types of operations were Star-shaped anoplasty (14%), anal transfer (4%), limited PSARP (4%), and cutback (2%). The overall results of continence were comparably good in all groups but with lower rate of recurrent fistula and soiling in those with Hendren's technique and anterior Z plasty.

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### **Hepatic Artery Aneurysm in a 14-year-old Girl: A Case Report**

*A Mungnirandr, J Soongswang, M Lauhapensang*

Mycotic aneurysm occurs uncommon today especially in paediatric patients. Majority (90%) occur from atherosclerosis, only 10 per cent originate from mycotic aneurysm. Clinical symptoms frequently present with only pyrexia of unknown origin followed by collapse due to rupture of aneurysm.

We present a case of 14-year-old girl with Tetralogy of Fallot. She developed clinical symptoms of infective endocarditis. Three weeks later she developed acute abdominal pain. Investigation (including abdominal ultrasonography and computer tomography) showed common hepatic artery aneurysm. She was treated conservatively by antibiotic for 3 months. Repeated computer tomography showed increasing hepatic artery aneurysm size. So we performed aneurysmectomy and lower pole splenectomy. Post operative condition was uneventful.



### Rehbein's Procedure for Hirschsprung's Disease, a-thirteen-year-experience in Ratchaburi Hospital

*S Thepcharoenrurund, C Sathornkich, P Talalak*

In 1953 Fritz Rehbein developed the procedure for Hirschsprung's disease that bears his name. He successfully used this operation on nearly 400 children. His procedure remains the operation of choice in many pediatric surgical centers worldwide. The principle for treatment of Hirschsprung's disease by Rehbein's procedure is to remove the aganglionic narrow segment including the dilated

sigmoid by dissection of the upper rectum deep down into the pelvic cavity about 2 cm from peritoneal reflection and to eliminate the achalasia of the internal anal sphincter by vigorous dilatation.

Between August 1987 and April 2000, 73 cases of Hirschsprung's disease (50 boys and 23 girls) were operated by Rehbein's procedure at the Pediatric Surgical Unit, Ratchaburi Hospital. The ages varied from 7 months to 10 years. Fifty five cases yielded very good result, good in 15 cases, satisfactory in 2 cases, and unsatisfactory in one case.

## ORTHOPEDIC SURGERY

### A Comparative Study of Biomechanical Rigidity of Various Internal Fixation Techniques in Transverse Fractures: An Experimental Analysis in Pig's Metacarpal Model

*S Numhom, Y Suwinchai, J Suwanprateeb, A Kruavit*

**Introduction:** The phalanges and metacarpals are among the most frequently fractured bone in the skeletal injuries. The prevention of angular or rotational deformities continues to challenge even the most experienced hand surgeon. The ideal fixation method would consist of the simplest technique and the minimum amount of material that provides the anatomical reduction, rigid fixation and early motion. Many types of internal fixation technique have been used in the treatment of hand fractures but no general agreement to the appropriate method of skeletal stabilization has been well established. The choice of technique in a clinical situation is also depended on the availability and the cost of the materials used. This study was conducted to compare the biomechanical rigidity of four different techniques of internal fixation in transverse fractures of pig's metacarpals.

**Materials and Methods:** Forty fresh frozen second and fifth metacarpals of commercial pigs were used. All specimens were approximately the same size. A transverse osteotomy was made with a high-speed reciprocated saw in the midportion of the bone and randomly divided into four groups of ten bones each. The experimental fractures were reduced and immobilized by one of the four techniques: cross K-wires, two right angle interosseous wire loops (90-90 technique), one oblique K-wire with one wire loop (Lister loop technique), and crossed K-wires with figure of eight wire loop (tension band technique). After rigid fixation,

the specimens were oriented in the same plane and mounted in methylnmethacrylate on both ends. The specimens were subjected to four-point bending test on an Instron universal material testing system (Instron 4502). The upper and lower jig separations were 16 and 48 mm respectively. The machine operated at a constant rate of 0.5 mm/min then the rigidity was defined as  $EI = (F/d) \times [(a^2/3) - (l^2/4)]$  where EI = bending rigidity (N/m<sup>2</sup>), F= applied load (N), d= deflection of the beam at the loading point (m), a = distance between load and support points (m), l = span between supports (m). The load and deformation curves were computed from an X-Y recorder assuming a constant curvature for the deformed bone between the upper contact of the four point bending jig.

**Result:** Statistical analyses were performed by analysis of variance and multiple comparison by Turkey method. The data on the rigidity of fixation in 4-point bending test was presented and computed for mean values and standard deviations. The 90-90 wiring technique showed the highest rigidity (0.229 N/m<sup>2</sup>) while the cross K-wire fixation showed the least rigidity among the four fixation techniques (0.121 N/m<sup>2</sup>). Statistically significant difference was found between 90-90 wiring fixation group and the other fixation technique groups (P<0.05).

**Conclusion:** Among the four techniques of bony fixation of pig's metacarpal bones compared in this study, 90-90 interosseous wire fixation showed the highest rigidity and statistical significantly stronger than other techniques. We would recommend this technique in a clinical situation because the technique is simple and easy to perform. Furthermore, the material is always available in the operation room and the operative cost is inexpensive.



## VASCULAR SURGERY

### Ascending Aorta to Bilateral Subclavian Arteries Bypass in a Patient with Bilateral Subclavian Arteries Stenosis and Subclavian Steal Syndrome

*W Tirapanich, S Attanavanich, P Samankativat, D Ratanakorn*

To present noninvasive diagnosis and surgical technique for the treatment of a patient with subclavian artery stenosis and subclavian steal syndrome.

A sixty-one-year old Thai man was referred to surgical department with symptoms of vertebro-basillar insufficiency and physical findings of right carotid and abdominal bruits, absent both brachial and diminished both femoral pulses. Duplex scan showed 75-95 per cent stenotic flow of right internal carotid artery, old occlusion of left internal carotid artery and alternated flow of both vertebral arteries with totally reversed flow after releasing of cuff test, suggesting subclavian-vertebral steal. He underwent prosthetic bypass from ascending aorta to both subclavian arteries. The postoperative course was uneventful. Post operative duplex scan showed improvement of right internal carotid flow and normal vertebral flow on both sides with clinical improvement of the patient's vertebro-basilar symptoms.

### Extended Replacement of Aorta for Chronic Type A Aortic Dissection

*K Luengtaviboon*

Usually replacement of ascending aorta is an adequate treatment for chronic type A aortic dissection. But in some patients, dilatation of aortic arch and descending aorta in chronic type A aortic dissection complicates the operative procedure. There are two operative approaches. The one recommended by many groups is a staged procedure-replacement of ascending aorta and aortic arch first via median sternotomy using elephant trunk technique. Then the second operation is replacement of descending aorta via left thoracotomy with transverse sternotomy (clamshell incision). We replaced the aortic arch under profound systemic hypothermia and circulatory arrest. Then after reperfusion of the arch, the ascending aorta was replaced. Replacement of descending aorta was performed while the patient was rewarmed. The advantages of this procedure are

1. One stage operation
2. The arch first technique shortens the cerebral

ischemic time and lower the risk of stroke after surgery. Retrograde cerebral perfusion is not necessary because of short arrest time.

3. Low body temperature gives good protection of lower body viscera and spinal cord against ischemia. The distal anastomosis can be done without perfusion of lower body. The technique is associated with low incidence of renal failure and paraplegia.

4. The incision gives excellent exposure of the heart, ascending aorta, arch and descending aorta down to the diaphragmatic opening of aorta. Hemostasis is usually satisfactory. The risk of reoperation for postoperative hemorrhage is minimal.

### Iliac Vein Compression Syndrome (May - Thurner Syndrome) : A Case Report

*W Tirapanich*

A 72-years-old Thai man was referred to Ramathibodi Hospital with complaint of progressive left leg swelling for two years. He could not wear a trouser and could not walk when he came to the hospital. Complete occlusion of proximal left common iliac vein was demonstrated by upper cavogram and ascending venogram. There was very high pressure gradient between the left common iliac vein (81 cm H<sub>2</sub>O) and the inferior vena cava using a 10 mm right PTFE graft with construction of temporary arteriovenous fistula between the left internal iliac artery and the left common iliac vein to enhance graft patency, the left common iliac vein pressure was reduced to 43 cm H<sub>2</sub>O immediately after the bypass procedure. There was no operative complication. After the bypass, clinical improvement was dramatic with marked reduction of swollen left leg. The patient is now living a normal life at 3 years follow-up.

### Pre-arterialization of Arterialized Venous Flap: An Experimental Study

*B Wungcharoen, P Thirakhuft, Y Santidhananon, N Semsiltham, K Kaewchijaroenkit, C Kolkijkovin*

Arterio-venous fistula causes haemodynamic and morphological changes to the local venous channels. We had adopted the concept of pre-arteriovenous fistula for study in viability improvement of arterialized venous flap.

Five groups of flap were created using abdominal skin of Wistar rat model (n=10/cach) with silastic sheet implanted underneath: Group 1 (control) containing flap without vascular supply; Group 2 (venous perfusion) containing single pedicled skeletonized vein and a draining vein; Group 3 (arterialized venous flap) containing an arteriovenous shunting proximal to the single pedicled skeletonized vein and a draining vein. In Group 4 (7-day pre-arterialization), the arterio-venous shunting was done 7 days prior to the arterialized venous flap raising as in Group 5 (14-day pre-arterialization) contained arterIALIZED venous flap as in group 3, but the arterio-venous shunting was done 14 days before flap raising. Survival of all flap area assessed 7 days after raising was 0, 22.21, 54.32, 62.21 and

97.47 per cent respectively. There was statistically significant difference in survival between venous perfusion venous flap and arterIALIZED venous group ( $p < 0.05$ ). Only the 14-day pre-arterIALIZED group had statistically significant better survival than arterIALIZED venous flap ( $p < 0.05$ ). Micro-angioarchitecture study by microvascular casting and scanning electron microscope of the pre-arterIALIZED group revealed dilatation of veins, numerous newly formed small sized vessels and diminish or absent of functioning valves. These data suggested that pre-arterIALIZED for 14 days improved the survival of arterIALIZED venous flap by increasing pathway for arterIALIZED blood flow through the flap.