ISSN 0125-6068

The Thai Journal of SURGERY

Official Publication of the Royal College of Surgeons of Thailand
www.rcst.or.th/ejournal

Volume 39 April-June 2018 Number 2

ORIGINAL ARTICLES

CASE REPORT

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Official Publication of Royal College of Surgeons of Thailand

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Official Publication of the Royal College of Surgeons of Thailand

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The THAI *Journal of* SURGERY

Official Publication of the Royal College of Surgeons of Thailand

Vol. 39 April - June 2018 No. 2

Original Article

Benefit of Post-mastectomy Radiotherapy for Breast Cancer Patients with T1-2 and 1-3 Positive Axillary Lymph Node

Poomipat Bhumisawatdi, MD
Doonyapat Sa-nguanraksa, MD
Pornchai O-charoenrat, MD

Division of Head Neck and Breast Surgery, Department of Surgery,
Faculty of Medicine Siriraj Hospital, Mahidol University

Abstract

Background: **Post-mastectomy irradiation is suggested in T1-2 and 1-3 positive axillary nodes. In Thailand, there is no consensus of radiotherapy in this group of patients.**

Patients and Methods: **Medical records of breast cancer patients with T1-T2, 1-3 axillary nodal metastasis and underwent modified radical mastectomy or total mastectomy with positive sentinel node biopsy were reviewed. Disease free survival (DFS) and overall survival (OS) were compared.**

Results: **There were 66 patients received radiotherapy and 92 patients did not receive radiotherapy. Survival analysis revealed that there was no significant difference in DFS and OS between the two groups. Subgroup analysis showed that radiotherapy in hormone receptor negative patients tended to result in better DFS.**

Conclusion: **The benefit of radiotherapy in T1-2 with 1-3 positive axillary nodes is not clear, however, selection of the patient to receive radiotherapy might result in better survival.**

Keywords: **breast cancer, radiotherapy, mastectomy, node positive**

Correspondence address: *Pornchai O-charoenrat, MD, Division of Head-Neck and Breast Surgery, Department of Surgery, Faculty of Medicine Siriraj Hospital, 2 Wanglang Road, Bangkok-noi, Bangkok 10700, Thailand; Telephone: 089-699-5775; Fax: +66 2419 8929; E-mail: pornchai.och@mahidol.ac.th*

Background

The principle of breast cancer treatment comprises of locoregional and systemic control of the disease. Advances in adjuvant systemic treatment, chemotherapy, hormonal therapy, and targeted therapy significantly improve outcome of breast cancer treatment. The extent of surgery for node positive breast cancer patients was reduced from radical mastectomy to Patey mastectomy and now modified radical mastectomy with excellence outcome[1,2]. Radiation to chest wall and regional lymph nodes warrants better outcome in women with positive axillary nodes after mastectomy and axillary dissection[3-7]. Radiotherapy after modified radical mastectomy in the patients with 1-3 positive axillary lymph nodes had shown survival advantage[8]. However, absolute benefit might be smaller in the patients with low risk of recurrence.

In Thailand, the availability of radiotherapy hinders the patients to access the treatment. Considerable proportion of breast cancer patients with 1-3 axillary nodes positive did not receive radiotherapy. In this study, we aimed to evaluate the benefit of post-mastectomy irradiation in breast cancer patients with 1-3 axillary nodes positive.

Patients and methods

Patients

The patients were recruited from the Division of Head Neck and Breast Surgery, Department of Surgery, Faculty of Medicine, Siriraj Hospital from January 2000 to December 2011. Medical records of breast cancer patients with T1-T2, 1-3 axillary nodal metastasis and underwent modified radical mastectomy or total mastectomy with positive sentinel node biopsy were reviewed. The patients who did not complete systemic treatment, loss to follow up, or had contraindication for radiotherapy were excluded. This study was approved by Siriraj ethical committee (certification of approval number si216/2017).

Statistical analysis

Continuous parameters were compared using non-parametric (Mann-Whitney) test. Distribution of categorical parameters were analyzed by Pearson Chi-square statistics or Fisher's exact test. Linear-by-linear association test was used to analyze ordinal parameters. Disease free survival (DFS) and overall survival (OS) among the patients with and without radiotherapy were compared by Log-rank test. The survival curve was estimated by Kaplan-Meier method. The *p*-value of <0.05 was considered as statistical significant.

Results

A total of 158 patients were enrolled. There were 66 patients received radiotherapy and 92 patients did not receive radiotherapy. Mean age at diagnosis was slightly higher in non-radiation group but not significant different. Higher proportion of radiation was found in premenopausal patients, 3 positive axillary nodes, and in the patients who received chemotherapy (Table 1). Only one chest wall recurrence was occurred in radiation group. In non-radiation group, 2 chest wall and 1 axillary recurrences were occurred. Sixteen distant metastasis was observed in non-radiation group, while 8 distant metastasis was occurred in radiation group. There was no significant difference regarding local recurrence and distance metastasis between radiation and non-radiation groups. There were 14 and 5 deaths were occurred in non-radiation and radiation group, respectively.

Survival analysis revealed that there was no significant difference in DFS between the two groups (p=0.77) (Figure 1). Subgroup analysis showed that in hormone receptor negative breast cancer patients, radiotherapy tended to result in better DFS, while in

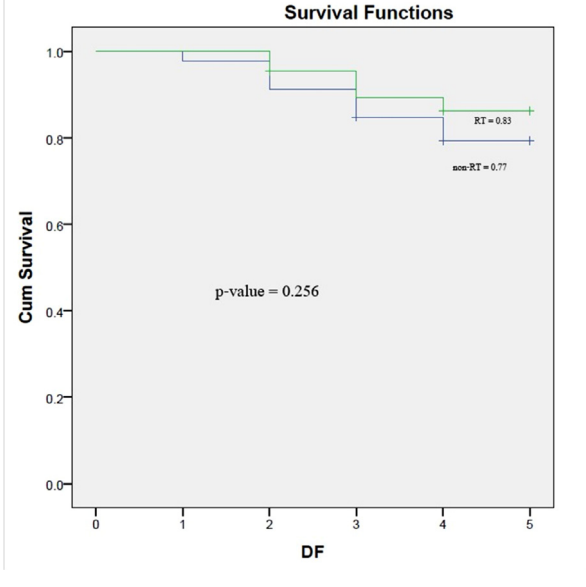

Figure 1 DFS by radiotherapy status among all patients.

Table 1 Characteristics of breast cancer patients according to radiotherapy status.

	No radiation, n=92	Radiation, n=66	*p*-value
Age, years, mean±SD	53.10±11.03	50.97±11.11	0.123[a]
Menopausal status			
Premenopause, n(%)	40 (43.5)	40 (60.6)	0.034
Postmenopause	52 (56.5)	26 (39.4)	
Tumor size, mm			
mean±SD	24.97±10.25	27.73±11.14	0.151[a]
Median (min-max)	24.00 (4.00-45.00)	25.00 (1.00-50.00)	
Number of positive node(s), n(%)			
1	54 (58.7)	28 (42.4)	0.020[b]
2	24 (26.1)	19 (28.8)	
3	14 (15.2)	19 (28.8)	
Staging, n(%)			
T1N1	25 (27.2)	15 (22.7)	0.526
T2N1	67 (72.8)	51 (77.3)	
Histologic type			
Invasive ductal carcinoma	80 (87.0)	59 (89.4)	0.569[c]
Invasive lobular carcinoma	4 (4.3)	4 (6.1)	
Other	8 (8.7)	3 (4.5)	
Histologic grading			
1	5 (6.3)	6 (10.2)	0.589
2	50 (63.3)	33 (55.9)	
3	24 (30.4)	20 (33.9)	
Angiolymphatic invasion			
Absence	61 (66.3)	55 (83.3)	0.017
Presence	31 (33.7)	11 (16.7)	
Estrogen receptor			
Negative	28 (30.4)	21 (31.8)	0.853
Positive	64 (69.6)	45 (68.2)	
Progesterone receptor			
Negative	36 (39.1)	28 (42.4)	0.677
Positive	56 (60.9)	38 (57.6)	
HER-2			
Negative	73 (79.3)	53 (80.3)	0.883
Positive	19 (20.7)	13 (19.7)	
Chemotherapy			
No	17 (18.5)	2 (3.0)	0.003
Yes	75 (81.5)	64 (97.0)	
Hormonal therapy			
No	25 (27.2)	23 (34.8)	0.301
Yes	67 (72.8)	43 (65.2)	

[a]non-parametric test

[b]linear-by-linear association

[c]Fisher's exact test

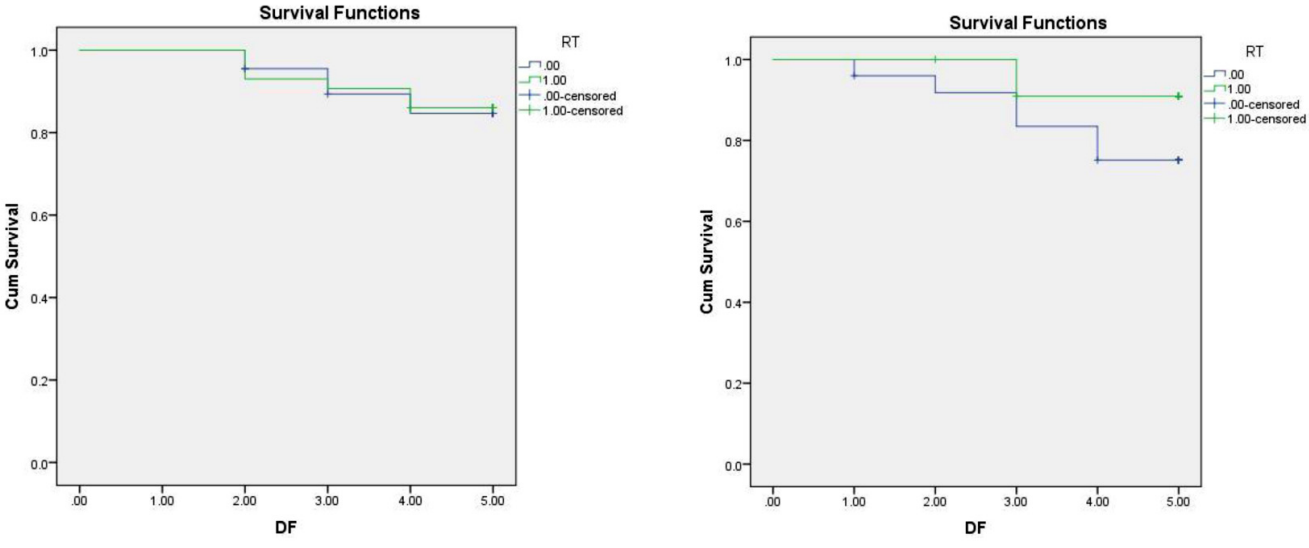

Figure 2 DFS by radiotherapy status. Left panel: hormone receptor positive breast cancer. Right panel: hormone receptor negative breast cancer.

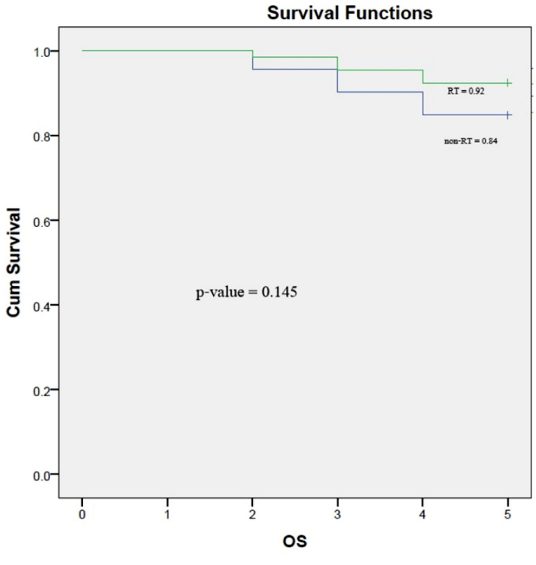

Figure 3 OS by radiotherapy status.

hormone receptor positive patients, similar DFS was observed (Figure 2). No significant difference was found in OS between the two groups (Figure 3).

Discussion

In this study, we evaluated the benefit of post-mastectomy radiotherapy for breast cancer patients with T1-T2 and 1-3 positive axillary nodes and found no significant difference in DFS and OS between the two groups of patients. Higher proportion of the patients with premenopausal status and higher number of nodes involved received radiotherapy. This might be due to concerning of locoregional recurrence in this group of patients. The extent of axillary node involvement indicates prognosis of the patients. The benefit of radiotherapy in axillary micrometastasis and isolated tumor cells is minimum and can be omitted[9]. In the patients with macrometastasis, the benefit of radiotherapy is significant. In the patients with 1-3 nodes positive, 15-year survival benefit was improved from 48% to 57% in the presence of radiotherapy. This benefit was emphasized in 4 or more nodes positive (12% vs 21%)[10]. EBCTGC meta-analysis also confirmed this effect[8]. Small sample size and short follow-up time leads to inadequate power to prove the benefit in this current study. The retrospective nature of this study might result in selection bias of the patients (eg. high risk patients received radiotherapy).

We found that hormone receptor negative breast cancer patients might be benefit from post-mastectomy irradiation. Hormone receptor positive patients have favorable tumor biology and can achieve long-term disease control during and after completion of hormonal therapy. This reduces the benefit of radiotherapy in this group of patients. Post-mastectomy irradiation should be considered in T1-T2, 1-3 positive axillary nodes with high risk features such as negative hormone receptor status.

ACKNOWLEDGEMENT

The authors would like to express their appreciation to Onchira Acharayothin for data collection and proof-reading.

REFERENCES

1. Baker RR, Montague AC, Childs JN. A comparison of modified radical mastectomy to radical mastectomy in the treatment of operable breast cancer. Ann Surg 1979;189:553-9.
2. Staunton MD, Melville DM, Monterrosa A, Thomas JM. A 25-year prospective study of modified radical mastectomy (Patey) in 193 patients. J R Soc Med 1993;86:381-4.
3. Hellman S. Stopping metastases at their source. N Engl J Med 1997;337:996-7.
4. Overgaard M, Hansen PS, Overgaard J, Rose C, Andersson M, Bach F, et al. Postoperative radiotherapy in high-risk premenopausal women with breast cancer who receive adjuvant chemotherapy. Danish Breast Cancer Cooperative Group 82b Trial. N Engl J Med 1997;337:949-55.
5. Overgaard M, Jensen MB, Overgaard J, Hansen PS, Rose C, Andersson M, et al. Postoperative radiotherapy in high-risk postmenopausal breast-cancer patients given adjuvant tamoxifen: Danish Breast Cancer Cooperative Group DBCG 82c randomised trial. Lancet 1999;353:1641-8.
6. Recht A, Edge SB, Solin LJ, Robinson DS, Estabrook A, Fine RE, et al. Postmastectomy radiotherapy: clinical practice guidelines of the American Society of Clinical Oncology. J Clin Oncol 2001;19:1539-69.
7. Ragaz J, Olivotto IA, Spinelli JJ, Phillips N, Jackson SM, Wilson KS, et al. Locoregional radiation therapy in patients with high-risk breast cancer receiving adjuvant chemotherapy: 20-year results of the British Columbia randomized trial. J Natl Cancer Inst 2005;97:116-26.
8. Ebctcg, McGale P, Taylor C, Correa C, Cutter D, Duane F, et al. Effect of radiotherapy after mastectomy and axillary surgery on 10-year recurrence and 20-year breast cancer mortality: meta-analysis of individual patient data for 8135 women in 22 randomised trials. Lancet 2014;383:2127-35.
9. Mamtani A, Patil S, Stempel M, Morrow M. Axillary Micro-metastases and isolated tumor cells are not an indication for post-mastectomy radiotherapy in stage 1 and 2 breast cancer. Ann Surg Oncol 2017;24:2182-8.
10. Overgaard M, Nielsen HM, Overgaard J. Is the benefit of postmastectomy irradiation limited to patients with four or more positive nodes, as recommended in international consensus reports? A subgroup analysis of the DBCG 82 b&c randomized trials. Radiother Oncol 2007;82:247-53.

บทคัดย่อ **ประโยชน์ของรังสีรักษาในผู้ป่วยมะเร็งเต้านมขนาดไม่เกิน T2 และมีการกระจายไปยังต่อมน้ำเหลืองรักแร้ 1-3 ต่อม**

ภูมิพัฒน์ ภูมิสวัสดิ์, ดุลยพัฒน์ สงวนรักษา, พรชัย โอเจริญรัตน์

สาขาศัลยศาสตร์ศีรษะ คอ และเต้านม ภาควิชาศัลยศาสตร์ คณะแพทยศาสตร์ศิริราชพยาบาล

ความเป็นมา: การให้รังสีรักษาเป็นการรักษาที่แนะนำสำหรับผู้ป่วยมะเร็งเต้านมขนาดไม่เกิน T2 และมีการกระจายไปยังต่อมน้ำเหลืองรักแร้ 1-3 ต่อม อย่างไรก็ตาม ยังไม่มีข้อสรุปของประโยชน์ที่ชัดเจนสำหรับผู้ป่วยกลุ่มนี้ในประเทศไทย

ผู้ป่วยและวิธีการ: เก็บข้อมูลจากเวชระเบียนของผู้ป่วยมะเร็งเต้านมขนาดไม่เกิน T2 และมีการกระจายไปยังต่อมน้ำเหลืองรักแร้ 1-3 ต่อม ได้รับการผ่าตัดเต้านมออกทั้งหมดและเลาะต่อมน้ำเหลืองรักแร้ ทำการเปรียบเทียบอัตราไม่มีโรคย้อนกลับเป็นซ้ำและอัตราการรอดชีวิตของกลุ่มที่ได้รับและไม่ได้รับรังสีรักษา

ผล: ผู้ป่วย 66 ราย ได้รับรังสีรักษาในขณะที่ผู้ป่วย 92 ราย ไม่ได้รับรังสีรักษา ไม่มีความแตกต่างอย่างมีนัยสำคัญของอัตราไม่มีโรคย้อนกลับเป็นซ้ำและอัตราการรอดชีวิตระหว่างสองกลุ่ม การวิเคราะห์กลุ่มย่อยพบว่าการให้รังสีรักษามีแนวโน้มลดการกลับเป็นซ้ำได้ในกลุ่มที่ไม่มีตัวรับฮอร์โมน

สรุป: ประโยชน์ของรังสีรักษาในผู้ป่วยกลุ่มนี้ยังไม่ชัดเจน อย่างไรก็ตามในผู้ป่วยบางรายอาจได้รับประโยชน์เช่นกลุ่มที่ไม่มีตัวรับฮอร์โมน

The THAI Journal of SURGERY 2018;39:45-49.
Official Publication of the Royal College of Surgeons of Thailand

Original Article

Subfascial Endoscopic Perforator Surgery (SEPS) for Patients with Chronic Venous Insufficiency: Peri-operative Outcomes

Prapong Wongraveekul, MD

General Surgery Division, Department of Surgery, Saraburi Hospital, Saraburi, Thailand

Abstract

Background: **Chronic venous insufficiency (CVI) is an uncomfortable condition which may result in pain and ulceration, especially in patients who fail compressive therapy. In this situation Subfascial Endoscopic Perforator Surgery (SEPS) is a treatment option for general surgeons who are familiar with endoscopic surgery. The author practiced and examined the effectiveness of SEPS in this group of patients.**

Methods: **Patients diagnosed with CVI who failed to compressive therapy and underwent SEPS between April 2007 July 2017 were included in this study. Peri-operative outcomes were reviewed.**

Results: **Ten patients had complications of CVI. Six patients have active ulcers and four patients suffered pain and swelling of their legs from lipodermatosclerosis. After the SEPS operation pain was relieved in 2 weeks and the mean of time to ulcers healing was 34.17 days.**

Conclusions: **SEPS is an effective alternative treatment for patients with CVI who fail compressive therapy and have active ulcer or lipodermatosclerosis.**

Keywords: **Chronic venous insufficiency, lipodermatosclerosis, subfascial endoscopic perforator surgery**

Introduction

Chronic venous insufficiency is an uncomfortable, often painful and distressing medical condition that may result in a change in lifestyle, disability and loss of working days. The patients suffer from pain and swelling of their legs from lipodermatosclerosis or have chronic ulcers. Non-operative management can usually heal the ulcer, but time to healing is frequently prolonged, adherence to compression treatment is cumbersome and in a warm climate wearing elastic stockings is annoying for many patients. Most importantly, ulcer recurrence remains an unsolved problem[1]. Frequently the pain is not subsided and the ulcers are not healed by compression treatment. Subfascial endoscopic perforator surgery(SEPS), division of incompetent perforating veins of the calf to treat patients with venous ulcers was first recommended by Robert Linton in 1938[2]. His procedure included a long skin incision made on the medial aspect of the leg to access all incompetent communicating veins that connect the superficial with the deep venous system. The original Linton operation to prevent reflux through incompetent perforators and to decrease ambulatory venous hypertension at the ankle area is rarely performed today. Wound complications, associated with the long skin incision made in diseased skin,

Correspondence address: *Prapong Wongraveekul, MD, General Surgery Division, Department of Surgery, Saraburi Hospital, 18 Thetsaban 4 Road, Amphoe Mueang, Saraburi 18000, Thailand; E-mail: prapong7002@hotmail.com*

were frequent and hospitalization was prolonged[2]. Therefore, variations of Linton's techniques were developed in subsequent years. These included the use of short longitudinal or transverse skin incisions to lessen the risk of wound complications, ligation of perforators above rather than under the fascia, or blind avulsion of the perforators by passing a shearing instrument in the subfascial space[4-8]. While wound complications were fewer, these operations were lacked of adequate visual control and undoubtedly missed important incompetent perforating veins. Endoscopic techniques have clear advantages because they improve visual control of perforator interruption, decrease wound complications and shorten hospital stay[9].

The aim of this study was to determine the peri-operative outcomes of chronic venous insufficiency who had active ulcers or lipodermatosclerosis which were treated with SEPS in the author's institution.

Materials and Methods

Data of patients with chronic venous insufficiency who had active ulcers or lipodermatosclerosis who underwent SEPS by the author from April 2007-July 2017 were extracted for this study. Their medical records were reviewed. All patients were treated on in-patient care.

The extracted data included age, sex, clinical presentation of chronic venous insufficiency, numbers of perforator veins clipped and transection and the peri-operative outcomes. This information is presented in Table 1.

Operations were performed on 10 limbs in 10 patients. Six patients had an active ulcers, which had been refractory to conventional therapy attempts such as compression. Four patients had lipodermatosclerosis. Relevant previous medical history is given. All patients were evaluated using Trendelenburg test, and duplex ultrasound. Nine patients had perforator veins reflux but no superficial veins reflux. One patient had a combination of superficial and perforator veins reflux, and all patients had no deep venous obstruction.

Indication

Patients with advanced CVI, who belong to clinical Class4 (lipodermatosclerosis), Class 5 (healed ulcer) or Class 6(active ulcer), based on the updated classification of the Committee of Reporting Standards of the Joint Vascular Societies[10], are potential candidates for the operation. Pre-operative evaluation should reveal the etiology of the disease (primary or post-thrombotic), the underlying pathophysiology (reflux, obstruction or both) and the site of the venous pathology (superficial or deep perforating veins,alone or in combination).

Endoscopic surgical technique

The patients are placed supine on the operating table. The affected leg is raised and a rubber band is wrapped around firmly continuously from the foot to the thigh to drain the blood from the leg. Then tourniquet is applied to the thigh. After prepping and

Table 1 Patients with CVI underwent SEPS with/without high ligation

Case number	Sex	Age (year)	Active ulcer	Lipoderma to sclerosis	Operation	Number of Perforator Vein transected	Time to Relieve Pain (days)	Time to Healed ulcer (days)	Complica-tion
1	Male	54	YES		SEPS	5		30	NO
2	Female	58		YES	SEPS	4	14		NO
3	Female	56		YES	SEPS	3	14		NO
4	Male	55	YES		SEPS	4		30	NO
5	Female	56	YES		SEPS+HL+VS	4		40	SSI
6	Female	59	YES		SEPS	5		45	NO
7	Female	57		YES	SEPS	5	14		NO
8	Female	56		YES	SEPS	4	14		NO
9	Female	57	YES		SEPS	4		30	NO
10	Female	42	YES		SEPS	4		30	NO

SEPS, Subfascial Endoscopic Perforator Surgery; HL, High ligation; VS, Venous stripping

draping the entire affected extremity, the leg is placed in a position of mild degree flexion of the knee using some pieces of cloth support under the knee. A 5 mm. diameter forward-looking endoscope is laid on the leg at the calf about 7 cm. medial to the boarder of the Tibia, ensuring that the proposed level of port placement allows the scope to reach the site distally just above the medial malleolus medially. The site at the point of entry at the skin is marked. A 10 mm. transverse skin incision is then made at the site. Blunt and sharp dissection is made to the subcutaneous fat until the enveloping fascia of Gastrocnemius muscle is found. A transverse 20 absorbable suture is made superiorly and the other suture is made inferiorly to the entry point of the port on the fascia about 10 mm.apart. The two previous sutures is hang up and a small longitudinal incision is made between the hanging sutures. A 5 mm port with trocar is inserted under direct vision. The trocar is removed and the two sutures are tied to prevent air leak during the operation. At this point the subfascial space has been entered. The scope is inserted and the CO_2 gas tube is connected to the port. CO_2 gas is insufflated to 30 mm/Hg. The scope with the port is moved side by side and advanced further to create subfascial space to the site corresponding for the second port to insert at 2 cm. medial to the boarder of the Tibia. A 5 mm. Transverse incision is made at the site. A 5 mm. port with trocar is inserted under direct vision by the scope.

Blunt and sharp dissection by endodissecter and endoscissors with electric cauterization is made to the bridging fascial band to expose the perforating veins, (Figure 1). The upmost perforating vein is dissected free from the surrounding fat and bands until enough space for clipping superiorly and inferiorly. Clipping is applied and division by endoscissors is made between the clips. Caution to stop any tiny points of bleeding is made to prevent obscuring the vision of the scope. Dividing the perforating vein further opens the space, permitting more distal visualization and dissection. The same manner of clipping and division is done advancing the scope and the endodissecter distally towards the ankle. The space is opened from the medial tibial border to the midline posteriorly and from the level of the port, to as far distaly as dissection can comfortably proceed (generally 2-3 cms above the medial malleolus).

At the end of the procedure the most superior perforating veins just below the second port are search again because of more space is seen for assuring completion of all the perforating veins are transected. At the completion of the procedure, the ports are removed, the fascial defects are left opened and the skin incisions are closed using absorbable suture and sterile strips. An elastic bandage is applied from the foot upward to the leg and distal thigh prior to deflating the tourniquet.

Results

The operating time was 90 to 150 minutes. The average numbers of perforators divided were 4.2. Mean hospital stay was 3 days (range, 2 to 5 days) and the adjunctive procedures was stripping of the saphenous vein (N=1). With a mean follow-up of 18 months (range 12 to 24 months), there was complete healing

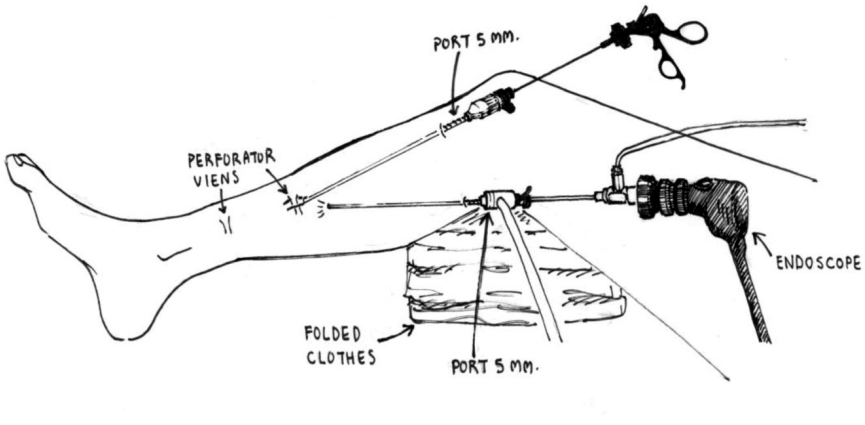

Figure 1 Showing the instruments used in the endoscopic subfascial ligation technique.

in 6 of 6 ulcers, and patients with clinical class 4-5 were improved in clinical symptoms. The average time to relief of pain was 14 days, and the average time to ulcer healing was 34.2 days. All patients were encouraged to wear 35-45 mm/Hg compression stockings for two weeks. No thromboembolic complications occurred. There was one complication noted: wound infection consisting of cellulitis around the port site. No any nervous complication is found.

Discussion

A systematic review of SEPS showed favorable results, with a reported ulcer healing rate of 88% and ulcer recurrence rate at a mean time of 21 months of 13%. For patients with severe CVI and active venous ulcers (C6), an intervention that improves healing and prevents recurrence has the potential to improve quality of life and reverse disability associated with this condition. The healing and recurrence outcomes after SEPS are, reportedly, much better than those in most trials of conservative therapies[11]. Despite the fact that we service a large referral population with CVI, the majority of our patients are managed quite well with conservative therapy emphasizing compression, elevation, and good skin care. Saphenous stripping or ligation is commonly offered when saphenous reflux is noted, but currently only patients who have recurrent or refractory disease are considered for further surgical intervention. Although most of these patients have multilevel venous disease, we routinely approach the superficial and perforating venous systems first. Surgical ablation of incompetent superficial and perforating veins is easier than deep venous reconstruction, and recently these limited interventions have been noted to improve deep venous insufficiency without deep venous repair[12].

SEPS combined with superficial venous surgery leads to successful healing with a low recurrence rate in patients with open and healed ulcers[13]. However, concomitant surgeries deemed necessary at the time of perforator interruption masked the effects of perforator vein intervention alone, as opposed to solitary ablation of superficial reflux. However, in a report from North America[2], during an average follow-up period of 5.4 months, ulcer healing was achieved in 21 of 27 C6 limbs (78%) in which the only manipulation was perforator interruption[14].

Conclusion

SEPS is a safe, minimally invasive procedure which should become an important part of the surgical armamentarium in treating patients with chronic venous ulcers. SEPS is an effective alternative treatment for CVI with complications. The series of the author predict the satisfactory outcomes.

REFERENCES

1. Mayberry JC, Moneta GL, Taylor LMJ, Porter JM. Fifteen-year results of ambulatory compression therapy for chronic venous ulcers. Surgery 1991;109: 575-81.
2. Linton RR. The operative treatment of varicose veins and ulcers, based upon a classification of these lesions. Ann Surg1938;107:582-93.
3. Cikrit DF, Nichols WK, Silver D. Surgical management of refractory venous stasis ulceration. J VascSurg 1988;7:473-8.
4. Cockett FB, Jones BD. The ankle blow-out syndrome: a new approach to the varicose ulcer problem. Lancet 1953;i:17-23.
5. Dodd H, Cockett FR, editors. The management of venous ulcers. In: pathology and surgery of the veins of the lower limbs. New York: Churchill-Livingstone; 1976. p. 269-96.
6. DePalma RG. Linton's operation and modification of the open techniques. In: Gloviczki P, Bergan JJ, editors. Atlas of endoscopic perforator vein surgery. London: Springer-Verlag; 1998. p. 107-13.
7. DePalma RG. Surgical therapy for venous stasis: results of a modified Linton operation. Am J Surg 1979;137:810-13.
8. Edwards JM. Shearing operation for incompetent perforating veins. Br J Surg 1976;63:885-6.
9. Pierik EG, van Urk H, Hop WC, Wittens CH. Endoscopic versus open subfascial division of incompetent perforating veins in the treatment of venous leg ulceration: a randomized trial. J VascSurg 1997;26:1049-54.
10. Porter JM, Moneta GL. Reporting standards in venous disease: an update. International Consensus Committee on Chronic Venous Disease. J VascSurg 1995;21:635-45.
11. Tenbrook JA, Iafrati MD, O'Donnnell TF Jr, et al. Systemic review of outcomes after surgical management of venous disease incorporating subfascial endoscopic perforator surgery. J Vasc Surg 2004;39:583-9.
12. Padberg FT Jr, Pappas PJ, Araki CT, et al. Hemodynamic and clinical improvement after superficial vein ablation in primary combined venous insufficiency with ulceration. J Vase Surg 1996;24:711-8.
13. Nelzén O, Fransson I. True long-term healing and recurrence of venous leg ulcers following SEPS combined with superficial venous surgery: a prospective study. Eur J Vasc Endovasc Surg 2007;34:605-12.
14. Gloviczki P, Bergan JJ, Menawat SS, et al. Safety, feasibility, and early efficacy of subfascial endoscopic perforator surgery: a preliminary report from the North American registry. J VascSurg 1997;25:94-105.

บทคัดย่อ **การผ่าตัด Subfascial Endoscopic Perforator Surgery ในผู้ป่วยที่มีภาวะหลอด เลือดดำอุดกั้นเรื้อรัง และมีภาวะแทรกซ้อนแผลเรื้อรัง หรือภาวะ Lipodermatosclerosis: ผลการรักษาหลังผ่าตัด**

ประพงษ์ วงศ์ระวีกุล

หน่วยศัลยกรรมทั่วไป, กลุ่มงานศัลยกรรม โรงพยาบาลสระบุรี

ความเป็นมา: ภาวะหลอดเลือดดำอุดกั้นเรื้อรังเป็นโรคที่ทำให้ผู้ป่วยประสบความทุกข์จากแผลเรื้อรังที่ไม่หาย หรือปวดขาจากภาวะ Lipodermatosclerosis ผู้ป่วยจำนวนมากได้รับการรักษาโดย Compressive Therapy และไม่ประสบความสำเร็จ การรักษาโดยการผ่าตัด Subfascial Endoscopic Perforator Surgery เป็นการรักษาทางเลือกหนึ่งของศัลยแพทย์ทั่วไปที่คุ้นเคยกับการผ่าตัดรักษาโดย Endoscopic Surgery ผู้วิจัยได้ปฏิบัติและศึกษาผลสำเร็จของการผ่าตัดในผู้ป่วยกลุ่มดังกล่าว

วิธีการศึกษา: ผู้วิจัยรวบรวมผู้ป่วยที่มีภาวะหลอดเลือดดำอุดกั้นเรื้อรังและมีภาวะแทรกซ้อนแผลเรื้อรัง หรือภาวะ Lipodermatosclerosis ระหว่างเดือนเมษายน 2007 ถึงเดือนกรกฎาคม 2017 และติดตามผลการรักษาด้วยวิธีข้างต้น

ผลการศึกษา: จากข้อมูลเวชระเบียน ผู้วิจัยพบผู้ป่วยที่เข้าเกณฑ์ข้างต้น 10 ราย ผู้ป่วย 6 รายมีแผลเรื้อรังที่ไม่หาย และผู้ป่วย 4 รายที่ปวดขาและมีภาวะ Lipodermatosclerosis ภายหลังการผ่าตัดรักษา อาการปวดทุเลาจนหายที่ 14 วันหลังผ่าตัด และแผลเรื้อรังหายที่ระยะเวลาเฉลี่ย 34.17 วันหลังผ่าตัด

สรุป: การผ่าตัด SEPS เป็นวิธีการรักษาทางเลือกหนึ่งที่มีประสิทธิภาพในการรักษาผู้ป่วยภาวะหลอดเลือดดำอุดกั้นเรื้อรังและมีภาวะแทรกซ้อนแผลเรื้อรัง หรือมีภาวะปวดขาและมีภาวะ Lipodermatosclerosis ที่ไม่หายด้วยการรักษาด้วย Compressive Therapy

The THAI Journal of SURGERY 2018;39:50-54.
Official Publication of the Royal College of Surgeons of Thailand

Original Article

Some Remarks on Preliminary Effectiveness of Vein to Vein Extracorporeal Membrane Oxygenation in Management of Serious Acute Respiratory Distress Syndrome at Bach Mai Hospital

Nguyen Quoc Anh, MD*
Dao Xuan Co, MD*
Pham TheThach, MD*
Nguyen Gia Binh, MD†

** Department of Anesthesia, Bach Mai Hospital, Ha Noi*
** Anesthesia and Critical Care Department, Ha Noi Medical University*
†ntensive Care Unit, Bach Mai Hospital, Hanoi

Abstract

Purpose: **Until now ARDS (Acute Respiratory Distress Syndrome) mortality rate remained as high at 40 to 60%. If applicable ECMO for cases that do not meet ventilation achieving, survival rates was improved from 50 to 70%. We evaluate the technical efficiency ECMO venous-venous (ECMO V-V) in the treatment of patients with severe ARDS.**

Materials and Methods: **Fifteen patients with ARDS without chronic disease, serious bleeding supported with ECMO venous - venous with ECA PaO_2 / FiO_2 <80, at the Intensive Care Unit Bach Mai Hospital enrolled.**

Results: **The mean age 45.7 ± 15.7 years (youngest 18, oldest 70), male / female = 8/7. APACHE II and SOFA Score: 16.2 ± 5.0 and 7.7 ± 3.4. ARDS may cause 4/15 (26.6%), bacterial, 2 cases of TB, viral 2/15, 11/15 (73.3%) do not see the root microorganisms. Ratio PaO_2 / FiO_2 before ECMO 58.4 ± 12.8 (37-78), while 10.2 ± 6.1 ECMO support (4-28 days). ECMO successful withdrawal rate 11/15 (73.3%), the survival rate 10/15 (66.7%), deaths 5/10 (33.3%). Some complications: bleeding catheter site 5/15 (33.3%) and wound infections 3/15 (20%) are the most common. 10.2 ± 6.1 time day ECMO.**

Conclusions: **ECMO V - V initially showed to be effective in treating severe ARDS. More research needs to be grounded on application as well.**

Keywords: **ECMO, ARDS, managememt of patients with severe ARDS**

Introduction

ARDS - Acute Respiratory Distress Syndrome is a common pathological which needs to care the Intensive care unit. Despite many advances in treatment, but mortality in patients with ARDS are reported through studies still up to 40-60%. Technique of ECMO - Extracorporeal Membrane Oxygenation is the last measure in managing the severe ARDS disease, does not respond to ventilation. The world has more than 100 centers perform ECMO in adults: proportion

Correspondence address: *Pham The THACH, MD, ICU, Bach Mai Hospital, Viet Nam; Telephone: +84 91595 6328; E-mail: pham thethach@gmail.com*

survival have been indicated to treat by ECMO below 35%, today's higher than 50 to 60%[1-3,5-8].

Now aday in Vietnam, ARDS were treated in major centers such as Bach Mai, one of the biggest medical centers in Vietnam. However, the mortality remains high, especially with the case of ARDS due to severity and progress, bleeding, do not respond to the artifficial ventilation. Since being introduced ECMO treatment of complex cases of ARDS patients have been survived. Therefore, we conduct the study aiming to assess the effectiveness of ECMO technique for the treatment of syndrome of ARDS and make recommendation for applying in the medical facilities.

Materials and Methods

Subjects

15 patients were diagnosed with ARDS as defined Berlin 2012, the severity of ARDS. The severity was defined as $PaO_2/FiO_2 \leq 100$ in ≥ 5 cmH_2O PEEP, severe ARDS does not respond to the methods of artificial ventilation optimal index: $PaO_2/FIO_2 < 80$ with $FIO_2 > 80\%$ prolonged > 3h or pH <7.25 (increased frequency ventilator to 35 times / minute) with Pplat <32 cm H_2O PEEP $\geq$ 10 cmH_2O in.

Exclusion criteria are the patients with chronic inability to recover and / or have contraindications to anticoagulation, thrombus in the jugular.

Methods

A prospective study, described clinically documented patient information form.

ARDS patients are resuscitation and treatment as recommended updates ARDS network, all the patients were mobilized by the method CPAP alveolar 40/40. Patients supported ECMO intravenous methods by two canul single vein. Way out taking blood from the femoral vein, the way into the right jugular vein.

Adjusting the ventilator at a minimum frequency 8l/f, VT placed 5 ml/kg, PEEP 8-15, keeping Pplateau <25.

Results

From January/2014 to August/2016 there are 15 ARDS qualified, supported by ECMO machine manner veins - veins, including 8 men and 7 women with mean age 45.7 ± 15, 7 (youngist 18 years old and oldest 70 years old). Cause of ARDS are 4/15 (26.6%) by bacteria, including 02 cases of tuberculosis, viral absence 2/15, 11/15 (73.3%) do not see the root microorganisms. 13/15 (86.7%) used a membrane ECMO, 2/15 (13.3%) to replace the 2nd ECMO membrane.

Survival patients are 10/15, accounting 66.7%, and died 5/10 accounting 33.3%, however there were 4/15 accounting 26.7% not ruled by ECMO due to irreversible serious lung pathology. Of the 10 patients were survived, 1 death after the 10th day after stopping ECMO by the nosocomial infection. 11/15 (73.3%) ECMO was stopped, however there were 4/15 (26.7%) not ruled due to irrrversible lung lesions.

General features ARDS patient groups before ECMO support.

5/15 (33.3%), pneumonia, ARDS severe circulatory failure was indicated for vasoactive drugs, the average dose is not high.

Features ARDS severe hypoxemia

Patients have P/F under 80, although much reduced compliance ventilated with alveolar mobilization measures, according to protocol ARDSnetwork high PEEP.

The change in the patient's blood oxygen ARDS

Chart 1 Changes in FiO2 ventilator during ECMO

Immediately after ECMO reduced oxygen breathing apparatus, ensuring PaO_2 58-80 as recommended by ARDSnetwork. After 2 days, FiO2 machine has recuded in the 5th day,100% reduction of around 50%.

Chart 2 Changes in PaO_2 after ECMO

10 ECMO patients were used ECMO in 5 days, 5 have been applied for 6 to 9 days, PaO_2 improved immediately after ECMO, with FiO_2 decreased 63.5 ± 27.9% at The change in the expansion of the lungs during ECMO.

Chart 3 Changes compliance

Expansion of lungl improved from day 4 to day 7, with the ventilator parameter settings for the lungs at rest with VT 4-5 ml/kg, frequenc 8.

Duration of ECMO application and common complications.

Chart 4 Distribution of cases by time supporting with ECMO

Table 1 Characteristics of the study group

Characteristics	Average ± Bias	Lowest - Highest
Pulse (rates/minute)	127,8 ± 21,0	98 - 160
Systolic blood pressure (mmHg)	118,0 ± 8,7	110 - 140
Diastolic blood pressure (mmHg)	65,0 ± 10,8	50 - 80
Urine (ml/h)	166,0 ± 110,0	60 - 400
proBNP (pcmol/L)	129,9 ± 89,9	21 - 248
Urea (mmol/l)	5,1 ± 2,7	2,5 - 10,9
Creatinin (µmol/l)	96,0 ± 38,6	51 - 152
Total bilirubin (µmol/l)	13,5 ± 3,7	9,7 - 19,9
White blood cell (G/L)	11,3 ± 5,9	4,8 - 23,0
Procalcitonin (ng/mL)	26,9 ± 41,9	0,33 - 100,0
SOFA	7,7 ± 3,4	3 - 12
APACHE II	16,2 ± 5,0	6 - 23
Lactat (mmol/l)	2,5 ± 1,9	0,9 - 6,7
Vasopressor dose (µg/kg/p)(n =5)	0,44 ± 0,23	0,2 - 0,8

Table 2 Characteristics of severe ARDS

Characteristics	Average ± Bias	Lowest - Highest
PaO_2/FiO_2	58,4 ± 12,8	37 - 78
$PaCO_2$ (mmHg)	41,6 ± 13,5	22 - 68
pH	7,37 ± 0,89	7,20 - 7,46
PEEP (cmH_2O)	15.6 ± 2,0	10 - 18
Compliance	17,6 ± 4,0	11 - 25
The time from when sick until at science HSTC (days) 7.0 ± 6.5 2-27	7,0 ± 6,5	2 - 27
Duration of ventilation before ECMO (day)	2,1 ± 2,5	0,5 - 7
Lenght stay in ICU (day)	21,9 ± 9,1	12 - 45

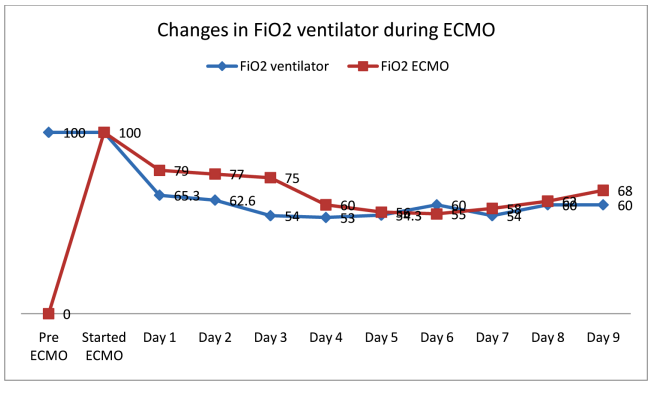

Figure 1

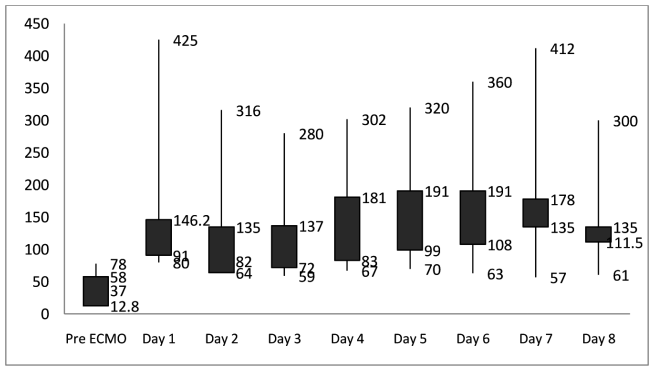

Figure 2

The average time of 10.2 ± 6.1 ECMO day (4-28). 6/14 (40%) stop ECMO 7 days, 12/15 (80%) stop ECMO before 11 days.

Common complications.

5/15 (33.3%), bleeding (bleeding catheter 3 cases, lung in 1 case) multi-organ failure 2/15 (13.3%), shock 3/15 (20%), arrhythmias 1 / 15 (6.7%), rupture of 1/15 (6.7%), extubation ofECMO 1/15 (6.7%), nosocomial infections 3/15 (20%).

Discussion

The average age in the study group, 45.7 ± 15.7 years old (minimum 18 oldest is 70). The results of the other study c as Le Duc Nhan 49.4 ± 20.4 years old[9], Ng

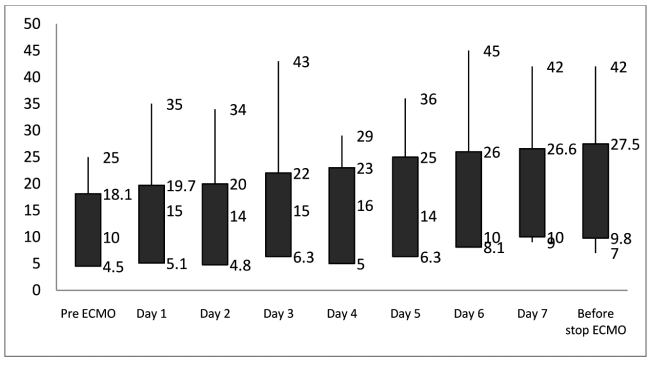

Figure 3

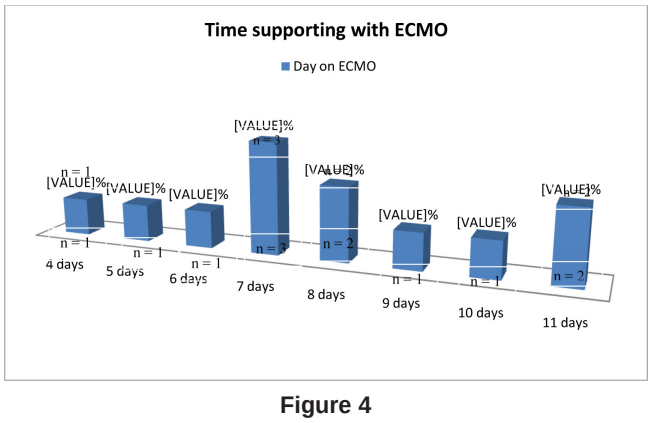

Figure 4

and Leung G.WY..KH 42.3 ± 14.1 years old[5].

APACHE II Score average 16.2 ± 5.0 (6-23 points) and point 7.7 ± 3.4 average SOFA (lowest 3 and Highest 12), in the study of Le Duc Nhan: were 21.1 ± 3.2 and 9.2 ± 2.5[9].

The average duration of ventilation before ECMO application were 2.1 ± 2.5 (0.5 to 7 days), average time supported by ECMO were 10.2 ± 6.1 day (from 4-28 days). Average length stay in ICU is 21.9 ± 9.1 (12-45 days). In the study of Zangrillo. A, SOFA average scores was 9, and the average duration of ventilation before ECMO support was 2 days, while the average day for ECMO was 10 days[10].

According to Davis A, period average ECMO support was 10 days (7-15) while Moore SA time ECMO support was 12,2 days (from 1 to 56 days)[11].

Features of severe ARDS group supported ECMO

Blood oxygen characteristics:

Before and at the start of ECMO support, 100% of patients were ventilated with FiO_2 100%, but the ratio P/F before ECMO 58.4 ± 12.8 (37-78) with a 15.6 average PEEP ± 2, 0 cmH_2O (10-18). In the study of Davis A et al before ECMO although optimal ventilator support but the ratio P/F average 56 (48-63) with PEEP average of 18 (15-20)[4].

Immediately after using ECMO reduced oxygen breathing apparatus, after 2 days, FiO_2 ECMO machine has reduced the 5th day, 100% reduction of around 50%.

The ratio P / F improved immediately after ECMO at PEEP 8, VT ventilator 5 ml / kg, 10/15 (66.7%) to the 5th ruler is ECMO.

Dilatometric (Compliance) lung:

Is a very important parameter to assess the expansion of lung damage. In our study, the expansion rate of lung was very low as 17.6 ± 4.0 ml / cmH_2O (11-25).

Outcomes of treatment:

Stoped ECMO successful in 11/15 cases (73.3%), however there were 4/15 (26.7%) which did not rule due to lung damage irreversible.

Survival were 10/15 (66.7%), deaths 5/10 (33.3%). Of the 10 patients are survived, one death after 10 days due to nosocomial infections. In the series of Davis, 68 patients accounting in 78% stopped ECMO successful, 13% of patients died during ECMO, the survival rate after detoxification ECMO was 71%, mortality 24%, discharge is 47%[4]. This result in our study is lower than the Davis A, possibly because our data is low. According to Moor SA, the pregnant patients survived whom required ECMO support was 77.8%[11].

Complications:

Bleeding is the most common complication, 5/15 (33.3%), including catheter sites bleeding 3 cases, the lungs 1 ca. Multi-organ failure 2/15 (13.3%), shock 3/15 (20%), arrhythmias 1/15 (6.7%), rupture of 1/15 (6.7%), extubation ECMO 1/15 (6.7%), nosocomial infections 3/15 (20%).

In series of Cheng. R, when applying the ECMO to support the cardiology shock, the complications are bleeding in 9.6%, infections in 15.9%, kidney failure in 30.8%[12].

According to Zangrillo A: The most common complication of kidney failure need hemodialysis continuously accounted for 52%, 33% infection, bleeding 33%, 29% ECMO membrane replacement[10]. In our study no kidney failure, other than the Zangrillo study because the author combinated analysis cardiogenic shock patients included. Bleeding complications in our series are the same of Zangrillo A,

but other complications may be lower due to our data less.

Conclusions

Despite the advances in medical management and resuscitation, the treatement of patients with ARDS particularly severe cases, bleeding complications is difficult and high mortality. The application of ECMO veins - veins initially showed to be effective in treating severe ARDS receiving artifficial ventilation does not respond. Reference studies worldwide show that this is technically feasible and effective in the treatment of ARDS and pathological use is recommended.

REFERENCES

1. Rubenfeld G, Caldwell E, Peabody E, et al. Incidence and outcomes of acute lung injury. N Engl J Med 2005;353:1685-93.
2. Eachempati SR, Hydo LJ, Shou J, Barie PS. Outcomes of acute respiratory distress syndrome (ARDS) in elderly patients. J Trauma 2007;63:344-50.
3. Estenssoro E, Dubin A, Laffaire E, et al. Incidence, clinical course, and outcome in 217 patients with acute respiratory distress syndrome. Crit Care Med 2002;30:2450.
4. Davies A, Jones D, Bailey M, et al. Extracorporeal membrane oxygenation for 2009 Influenza A(H1N1) acute respiratory distress syndrome. JAMA 2009;302:1888-95.
5. George WY Ng, Leung AKH, Sin SY, et al. Three-year experience of using venovenous extracorporeal membrane oxygenation for patients with severe respiratory failure. Hong Kong Med J 2014;20:407-12.
6. Hemmila MR, Rowe SA, Boules TN, et al. Extracorporeal life support for severe acute respiratory distress syndrome in adults. Ann Surg 2004;240:595.
7. Ullrich R, Lorber C, Röder G, et al. Controlled airway pressure therapy, nitric oxide inhalation, prone position, and extracorporeal membrane oxygenation (ECMO) as components of an integrated approach to ARDS. Anesthesiology 1999;91:1577.
8. Brogan TV, Thiagarajan RR, Rycus PT, et al. Extracorporeal membrane oxygenation in adults with severe respiratory failure: a multi-center database. Intensive Care Med 1999;35:2105.
9. Lec Nhun, Vu Van Dinh, Nguyen Dat Anh. Evaluating the effectiveness of artifficial ventilation by lung expansioné technique in treatment of respiratory distress progression. Practical Medicine Journal 2011;9:98-102.
10. Zangrillo A, Biondi-Zoccai G, Landoni G, et al. Extracorporeal membrane oxygenation (ECMO) in patients with H1N1 influenza infection: a systematic review and meta-analysis including 8 studies and 266 patients receiving ECMO. Crit Care 2013; 13;17.
11. Moore SA, Diet CA, Coleman DM .Extracorporeal life support during pregnancy. J Thorac Cardiovasc Surg 2016;151.
12. Cheng R, Hachamovitch R, Kittleson M, et al. Complications of extracorporeal membrane oxygenation for treatment of cardiogenic shock and cardiac arrest: a meta-analysis of 1,866 adult patients. Ann Thorac Surg 2014;97:610-6.

The THAI Journal of SURGERY 2018;39:55-60.
Official Publication of the Royal College of Surgeons of Thailand

Original Article

A Simple Method of Truncal Vagotomy for the Definitive Treatment of Chronic Duodenal Ulcer Perforation

Anuwat Chantip, MD

Department of Surgery, Lampang Regional Hospital

Abstract

Objective: **To present a simple method of truncal vagotomy procedure, especially for the posterior vagal trunk, for standard definitive treatment of chronic duodenal ulcer perforation, in operable patients with suspected low compliance to receive a complete course of postoperative *Helicobacter pylori* eradication.**

Material and methods: **A retrospective review of patients who underwent truncal vagotomy and pyroloplasty versus simple closure of perforation site for chronic duodenal ulcer perforation between September 2012 and June 2017. Clinical characteristics and surgical outcomes of patients, and details of surgical techniques for easy posterior truncal vagotomy were described.**

Result: **There were 28 chronic duodenal ulcer perforation patients in this study. Sixteen patients underwent simple closure perforation site with non-absorbable suture. Twelve patients underwent truncal vagotomy and modified Heineke-Mikulicz pyloroplasty. The ASA functional classification, co-morbid diseases and baseline characteristic of patients between both groups were similar. The operative time was also not significantly different between operations. There was no morbidity and mortality at the 30 days of follow up.**

Conclusion: **Simple posterior truncal vagotomy can be done safely with similar operative time as for simple closure in patients with perforated chronic duodenal ulcer.**

Keywords: **Truncal vagotomy, chronic duodenal ulcer perforation, recurrent duodenal ulcer perforation**

INTRODUCTION

The excellent acid secretion control with proton pump inhibiter and H2 receptor antagonists along with the discovery of *Helicobactor pylori* as playing an important role in peptic ulcer disease[1], have made vagotomy a rare procedure. When required, truncal vagotomy is generally performed in conjunction with either pyloroplasty or antrectomy[2] .

The vagus nerve play role in regulating gastric acid production and parasympathetic esophageal plexus of the vagus nerve give branch of anterior and posterior vagal trunk through the esophageal hiatus at the diaphragm. The anterior (left) vagal trunk is seen on anterior surface of distal esophagus, the posterior (right) vagal trunk usually closer to the right margin of esophagus and lies away from esophageal wall in loose areolar tissue on right crus of the diaphragm. After passing through esophageal hiatus, anterior vagal trunk was divided to a Hepatic division, run into the porta hepatis in lesser omentum, and principle anterior

Correspondence address: *Anuwat Chantip, MD, Department of Surgery, Lampang Regional Hospital, Lampang 52000, Thailand; Telephone: +66 81020 5775; E-mail: achansur@hotmail.com*

nerve of Latarjet. Similarly the posterior vagal trunk divided into a large caliber division and principle posterior nerve of Latarjet. The variation involving the posterior vagal trunk was less common than those of anterior vagal trunk, but more difficult to visualize the posterior vagal element, criminal nerve of Grassi, and likely to be missed.

Perforation is often the first clinical presentation of peptic ulcer disease[3]. The perforation site usually located at the anterior wall of duodenum (60%) and lesser curvature gastric ulcers[4]. The peak incidence of age is 12-60 years and the current management for perforated peptic ulcer can be done with conservative management (Taylor method) based on the theory that effective gastric decompression and continuous drainage will enhance self healing[5,6]. However, in patients more than 70 year of age or shock at admission were associated with a high mortality rate (64%) by conservative treatment.

After discovery of the role of *H. pylori* in peptic ulcers diseases by Barry J. Marshall and Robin Warren in 1982. More than 90% of duodenal ulcer and 80% of gastric ulcer were cause by this organism. The management of peptic ulcer disease was recommended that ulcer patients positive for *H. pylori* should be treated with antimicrobial agents[7], according to the Maastricht 3 consensus report, with triple drug regimen plus proton pump inhibitor. However, with the acid secretion control with proton pump inhibitor and *H. pylori* eradication[8,9], the need for surgery for perforated peptic ulcer has remained stable.

Vagotomy procedure, gradually decline, is one of the additive definite procedure for chronic duodenal ulcer perforation. But, many surgeons have limited experience nowadays. It should be considered for patients who are found to be *H.pylori* negative, recurrent ulcers10 despite triple therapy and for low compliance patient to receive complete *H. pylori* eradication after simple closure.

This study was tried to conduct the simple surgical tips to do the vagotomy procedure especially for posterior vagal trunk, more difficult than anterior vagal trunk. This technique can be done in limited time without left lobe liver mobilized, need no encircle EG junction or dissection lesser omentum, as mention by the classical procedure, to avoid injury to nearby organ, adjacent blood vessels or weakened esophageal hiatus and lessen post-vagotomy complication.

Material and methods

A single institution retrospective review during the period between September 2012 - June 2017. Ninety one perforated peptic ulcer patients were identified and collected, approval by Lampang Regional Hospital research ethics committee. All of the patients were categorized as acute duodenal ulcer perforation, chronic duodenal ulcer perforation and gastric ulcer perforation. There are only 12 cases from 28 cases of chronic duodenal ulcer perforation, which had definite surgical treatment by truncal vagotomy and pyroloplasty, single surgeon performed. Post operative outcomes were reviewed from medical chart and records reports as operative times, duration of hospital stayed and complication after discharge follow up.

The demographic data of these groups were expressed as number, mean and standard deviation (SD) and compared the data of patients in simple closure method and patients who underwent truncal vagotomy and pyloroplasty group. The different between two groups were evaluated using chi-square test, *t*-test. The *p*-value of less than 0.05 is considered statistical significant.

The classical open truncal vagotomy procedure can be done with mobilization of left lobe of liver with left triangular ligament dissection and left lobe liver medial retraction to exposed and incised pars flaccida, then bluntly encircle esophagogastric junction with penrose drain. After esophagogastric junction is being retracted laterally, the right vagal trunk is identified. For the left vagal trunk, usually easier identified within the musculature part of distal esophagus

To performed open posterior truncal vagotomy in this study, my technique, just only place abdominal swab packing between posterior-lateral aspect of spleen and inferior surface of left hemidiaphragm to avoid short gastric vessel stretching and further inadvertent injury during EG junction dissection. Next step is to use index finger of surgeon' s right hand for blunt dissection (Figure 1) at the left lateral aspect of EG junction adjacent to left crus of diaphragm anterior to abdominal aorta. We can use the 3rd finger of surgeon' right hand for downward and medially traction of the angle of His with the 4th, 5th finger place over fundus of stomach. We can feel a taut bowstring by the index finger, usually single, posterior vagal trunk nearby

right crus of the diaphragm and then used right angle clamp with surgeon' s left hand to hold this nerve (Figure 2), 1-2 cm. of this trunk is excised between ligatures or clips. This approach can identified the posterior gastric branch, criminal nerve of Grassi, short gastric vessels and spleen obviously.

This technique can be done within minutes, without dissection left triangular ligament, left lobe liver mobilization, encircle or even sling the esophagus.

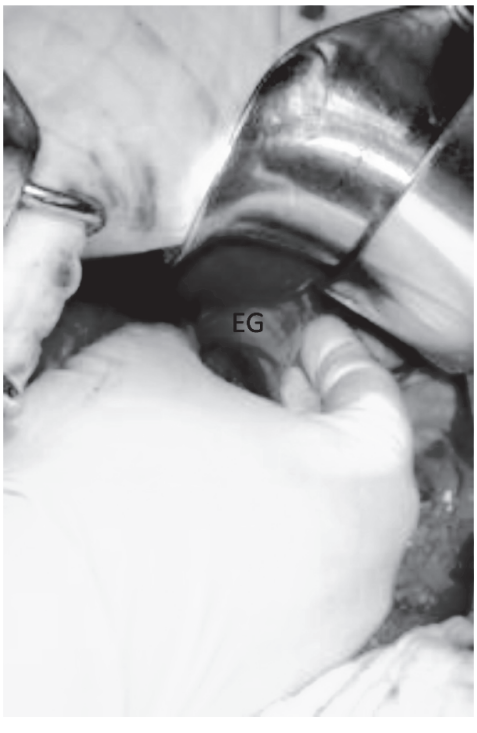

Figure 1 Blunt finger dissection, left side esophagogastric (EG) junction approach

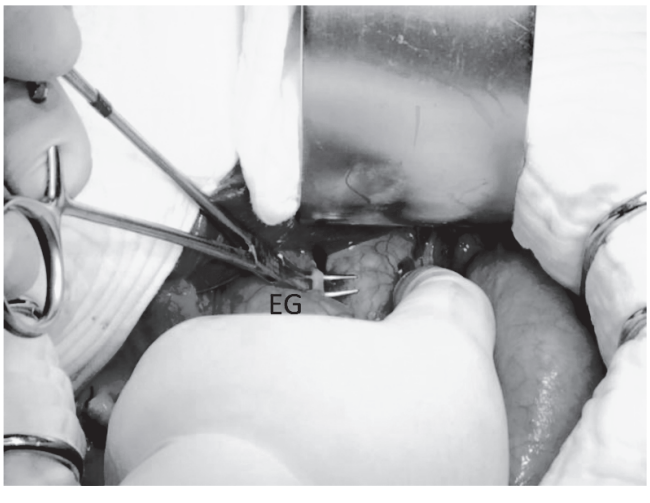

Figure 2 Right posterior vagal trunk was sling with right angle clamp of surgeon' left hand

These were tried to shortening operative time and get easier access to do the posterior truncal vagotomy procedure.

For the anterior truncal vagotomy, left vagal trunk, can be seen in the anterior surface of intra-abdominal esophagus and made more prominent by downward traction of stomach to render the esophagus then mobilized the vagus with right angle clamp, segment of vagus nerve is excised between ligature or clip.

Vagotomy is generally performed in conjunction with drainage, resection or diversion procedure. The definite procedure for chronic duodenal perforation in this study were truncal vagotomy and modified Heineke Mikulicz pyroloplasty procedure.

Result

There were 91 perforated peptic ulcer patients who underwent emergency operation from September 2012 to June 2017. Sixty three patients, who presented with acute duodenal ulcer perforation and gastric ulcer perforation, were excluded. Twenty eight patients, chronic duodenal ulcer perforation, were included in this study. The baseline characteristics between two groups were summarized in Table 1. The average age in the simple closure group was slightly higher but was not statistically significant. In case of simple closure group, four patients developed symptom more than 48 hours prior to admission. The average time of symptoms prior to admission was significantly higher in the simple closure group. The ASA class, ulcer size, degree of contamination, operative time and length of stayed were similar in both groups. The clinical characteristics and outcome were shown in Table 2. The only significant parameter is totally accumulation of peri-operative complication (p-value=0.036), such as the preoperative shock, respiratory failure and reoperation were occurred only in simple closure group (Table 3). After discharge, the patients have an appointment at 1 month for evaluation of the delayed complication. They were found to have no complications following the procedure (post vagotomy diarrhea, wound infection).

Discussion

Prompt diagnosis and treatment of chronic duodenal ulcer perforation with operative intervention

Table 1 Demographic data of chronic duodenal ulcer perforation patients

	Simple closure(16)	TVP(12)	*p*-value
Age (year), (Mean±SD)	68.75±12.89	61±18	0.195
Sex male	12	8	0.561
Female	4	4	
Weight (kg), (mean ±SD)	48.62±10.44	50.41±8.60	0.633
Symptom PTA (hour), (mean±SD)	34.5±45.57	7.2±6.73	0.025
ASA class (median)	2.62(2)	2.33(2)	0.345
Co-morbidity conditions			
Diabetes	0	2	0.094
Hypertension	2	3	0.467
Coronary heart disease	2	0	0.356
NSAID used	1	2	0.431
Alcoholic	4	4	0.750
Smoking	2	4	0.239
Anemia	0	1	0.107
Previous DUP operation	1	1	0.887

PTA: prior to admission; DUP: duodenal ulcer perforation

Table 2 Comparison of clinical characteristics and outcome between 2 groups

	Simple closure(16)	TV (12)	*p*-value
White blood count, mm^3 (mean±SD)	8,621.87±5,383.89	12,559±6696.01	0.243
Ulcer size (cm)	0.64±0.32	0.56±0.33	0.561
Degree of contamination	Moderate	Moderate	
Operative time (min)	32.81±13.28	40.33±20.98	0.256
Length of stay (d)	8.18±6.16	5.41±0.79	0.135
Peri-operative complication	10	3	0.036

is almost always indicated. Unfortunately, risk of mortality range from 6% to 14%[11-13] in recent studies, several variables have been independently associated with an increase risk of mortality including age, American society of Anesthesiologist (ASA class), hypoalbuminemia, shock on admission[14], Creatinine level[15] and delayed in diagnosis and management (more than 24 hours)[16], advance age (> 70 year) is associated with higher mortality, rate of approximately 41%[17,18]. Many scoring system including the Boey scoring system, Manheim peritonitis index[19] and PULP score have been used to stratified the risk of the patients and predict the outcomes of patients with perforated peptic ulcer, but the strongest simple mortality predictor is hypoalbuminemia.

Surgery is the mainstay of treatment for perforated peptic ulcer. Disease is mainly occurred at the duodenal bulb, followed by the pyloric region and the gastric body[20]. The patients should be evaluated for Helicobacter pylori, present in 70-90% of duodenal ulcer and antibiotic therapy is the effective treatment. Nowadays, the most common method for the management is patch repaired with an omental pedicle, Graham patch, simple closure or omentopexy[21], followed by *H. pylori* eradicated medication. The definitive repair, accompanied by ulcer operation either

Table 3 Perioperative complication

	Simple closure[10]	TV (3)	*p*-value
Pre-operative shock	3	2	0.385
Post-operative shock	0	1	0.263
Pneumonia	2	0	0.185
Respiratory failure	4	0	0.052
Re-operation	1	0	0.256

a vagotomy or pyloroplasty, was declined then many surgeons practicing today have limited experience with these definitive ulcer operation.

For the patients, whom the definite ulcer surgery should be considered are those with duodenal ulcer perforation and chronic recurrent ulcer despite triple therapy. In this setting, truncal vagotomy and pyloroplasty, simple closure and parietal cell vagotomy or antrectomy with truncal vogotomy have all been advocated as suitable repair but the choice of definite operation should depended on experience of surgeon. This study was tried to performed easier definitive procedure, especially the trucal vagotomy method, with the similar total operative time as simple closure or patch technique. All case of definite procedure were underwent truncal vagotomy and modified Heineke-Mikulicz pyloroplasty, surgeon preference. After operation, with a short follow up, they all had no detectable dumpimg or post vagotomy diarrhea. Postoperative complication rates were significantly different between 2 groups, with more complications in the simple closure group possibly due to longer duration of symptoms prior to admission.

The most challenging clinical scenario for truncal vagotomy and pyloroplasty is the large, chronic and fix perforated kissing duodenal ulcer. The risk of repaired failure was high, from leakage pyloroplasty even in case of simple suture or omental patch repair, up to 12%[22]. In that case, the recommendation composed of tube duodenostomy, jejunal pedicle graft, jejunal serosal patch, partial gastrectomy or disconnection[23,24]. Finally, the choice of repair should be depended on patient's clinical status, degree of contamination, ulcer size, location of perforation and surgeon experience.

Conclusion

Due to the widespread use of PPI in the last twenty years, the anti-ulcer operation were significantly decreased, especially an open procedure. In my opinion, this open procedure for group of patients with low compliance and alcoholics, they will not follow recommendation for post-operative antiulcer treatment, especially the recurrence chronic duodenal ulcer perforation patients. This simple open approach for truncal vagotomy and drainage procedure can be safely performed, not inferiorly than the classical methods.

REFERENCES

1. Marshall BJ, Warren JR. Unidentified curved bacilli in the stomach of patients with gastritis and peptic ulceration. Lancet 1984;1:1311.
2. Lagoo J, Pappas TN, Perez A. A relic or still relevant: the narrowing role for vagotomy in the treatment of peptic ulcer disease. Am J Surg 2014;207:120.
3. Druart ML, Van Hee R, Etienne J, et al. Laparoscopic repair of perforated duodenal ulcer: a prospective multicenter clinical trial. Surg Endosc 1997;11:1017-20.
4. Zittel TT, Jehle EC, Becker HD. Surgical management of peptic ulcer disease today: indication, technique and outcome. Langen-becks Arch Surg 2000;385:84-96.
5. Bucher P, Oulhaci W, Morel P, et al. Results of conservative treatment for perforated gastroduodenal ulcers in patients not eligible for surgical repair. Swiss Med Wkly 2007;137:337-40.
6. Donovan AJ, Berne TV, Donovan JA. perforated duodenal ulcer: an alternative therapeutic plan. Arch Surg 1998; 133:1166-71.
7. Fischbach LA, Goodman KJ, Feldman M, Aragaki C. Sources of variation of Helicobacter pylori treatment success in adults worldwide: a meta-analysis. Int J Epidermal 2002; 31:128-39.
8. Sivri B. Trends in peptic ulcer pharmacotherapy. Fundam Clin Pharmacol 2004;18:23-31.
9. Malfertheiner P, Megraud F, O'Morain C, et al. Current concepts in the management of helicobacter pylori infection: the Maastricht III Consensus Report. Gut 2007; 56:772-81.
10. Schwesinger WH, Page CP, Sirinek KR, et al. Operation for peptic ulcer disease: paradigm lost. J Gastrointest Surg 2001;5:438-443.
11. FY L e, Leung KL, Lai BS, et al. Predicting mortality and morbidity of patients operated on for perforated peptic ulcer. Arch Surg 2001;136:90-4.
12. Arici C, Mesci A, Dincer D, et al. Analysis of risk factors predicting (affecting) mortality and morbidity of peptic ulcer perforation. Int Surg 2001;92:147-54.
13. Kocer B, Surmeli S, Solak C, et al. Factors affecting mortality and morbidity in patients with peptic ulcer perforation. J Gastroenterol Hepatol 2001;22:565-70.
14. Bucher P, Oulhaci W, Morel P, et al. Results of conservative treatment for perforated gastroduodenal ulcer in patients not eligible for surgical repair. Swiss Med Wkly 2007;137:337-40.
15. Moller MH, Shah KJ, et al. Risk factors in patients surgically treated for peptic ulcer perforation. Scand J Gastroenterol. 2009;44:145-52. 142. Following 152.
16. Boey J, Choi SK, Poon A, Alagaratham TT. Risk stratification in perforated duodenal ulcers. A prospective validation of predictive factors. Ann Surg 2001;205:22-6.
17. Uccheddu A, Floris GM, Altana M, et al. Survey for perforated peptic ulcer in the elderly. Evaluation of the factors influencing prognosis. Hepatogastroenterology 2003;

50:1956-8.
18. Tsugawa K, Koyanaki N, Hashizume M, et al. The therapeutic strategies in performing emergency surgery for gastroduodenal ulcer perforation in 130 patients over 70 years of age. Hepatogastroenterology 2001;48:156-62.
19. Linder MM, Wacha H, Feldmann U, et al. The Mannheim peritonitis Index. An instrument for the intraoperative prognosis of peritonitis. Chirurg 2001;58:84-92.
20. Bertleff MJ, Lange JF. Laparoscopic correction of perforated peptic ulcer: first choice? A review of literature. Surg Endosc 2010;24:1231-9.
21. Cellan-Jones CJ. A rapid method of treatlment inperforated duodenal ulcer. Br Med J 1929;1:1076-7.
22. Jani K, Saxena AK, Vaghasia R. Omental plugging for large-sized duodenal peptic perforations: a prospective randomized study of 100 patients. South Med J 2006;99;467-71.
23. Lal P, Vindal A, Hadke NS. Controlled tube duodenostomy in the management of giant duodenal ulcer perforation: a new technique for surgically challenging condition. Am J Surg 2009;198:319-23.
24. Gupta S, Kaushik R, Sharma R, et al. The management of large perforations of duodenal ulcers. BMC Surg 2005;5:15.

บทคัดย่อ **การตัดเส้นประสาทเวกัสส่วนโคนอย่างง่ายสำหรับการรักษาแบบแน่นอนในผู้ป่วยแผลเป็ปติกดูโอดีนัมเรื้อรังทะลุ**

อนุวัติ จันทิพย์

กลุ่มงานศัลยกรรม โรงพยาบาลลำปาง

วัตถุประสงค์: เพื่อจะนำเสนอวิธีการทำ truncal vagotomy procedure อย่างง่าย สามารถทำได้ในระยะเวลาอันรวดเร็ว โดยเฉพาะในส่วนของ posterior vagal trunk ซึ่งการทำหัตถการ truncal vagotomy จะทำในการรักษาแบบจำเพาะสำหรับผู้ป่วยที่เป็นโรค chronic duodenal ulcer perforation ในกรณีที่ผู้ป่วยนั้นมีข้อบ่งชี้และการรักษาโดยการทำ simple closure perforation ร่วมกับการกำจัดเชื้อ *H. pylori* นั้นไม่สามารถทำได้ เช่นในผู้ป่วยที่มีการเกิด recurrent duodenal ulcer perforation, ผู้ป่วยที่ไม่เข้าใจ และไม่สามารถปฏิบัติตามแผนการรักษาอย่างเคร่งครัด

วัสดุและวิธีการ: เป็นการศึกษาย้อนหลังในผู้ป่วยแผล peptic ชนิด chronic duodenal ulcer perforation โดยเปรียบเทียบวิธีการผ่าตัดแบบ simple closure perforation กับผู้ป่วยที่ได้รับการผ่าตัด truncal vagotomy pyloroplasty ในช่วงระหว่างเดือน กันยายน 2555 ถึงเดือน มิถุนายน 2560 โดยมีการแจกแจงกลุ่มประชากรที่เข้ามาในการศึกษา,ผลการรักษาและได้นำเสนอรายละเอียดวิธีการผ่าตัด posterior truncal vagotomy แบบง่าย

ผลการศึกษา: มีผู้ป่วย chronic duodenal ulcer perforation ที่นำเข้ามาในการศึกษาทั้งหมด 28 ราย, 16 ราย ทำหัตถการ simple closure perforation, 12 รายทำการผ่าตัด truncal vagotomy pyloroplasty ชนิด modified Heineke Mikulicz pyloroplasty มีการแจกแจงปัจจัยพื้นฐานโรคร่วม รวมทั้งความแข็งแรงของผู้ป่วย ทั้งนี้ไม่พบความแตกต่างกันของกลุ่มประชากรที่นำเข้ามาศึกษาทั้ง 2 กลุ่ม โดยเฉพาะระยะเวลาในการทำหัตถการทั้ง 2 แบบไม่ได้แตกต่างกัน และจากการติดตามผู้ป่วยหลังจำหน่ายไปแล้ว 1 เดือน ก็ไม่พบผลแทรกซ้อนและการเสียชีวิต

สรุป: การทำหัตถการ truncal vagotomy สามารถทำได้โดยใช้ระยะเวลาสั้นและมีความปลอดภัย ใกล้เคียงกับ simple closure perforation ในผู้ป่วย perforated chronic duodenal ulcer

The THAI Journal of SURGERY 2018;39:61-64.
Official Publication of the Royal College of Surgeons of Thailand

Case Report

Severe Anaphylaxis Associated with Isosulfan Blue Injection Used for Sentinel Node Detection: A First Case Report in Thai Breast Cancer Patients

Chayanuch O-charoenrat
Doonyapat Sa-nguanraksa, MD, PhD

Division of Head-Neck and Breast Surgery, Department of Surgery,
Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.

Abstract **Anaphylaxis is a severe systemic allergic reaction that generally manifests clinically as respiratory difficulty and circulatory collapse. It results from massive release of preformed mediators such as histamine from mast cell and basophils. Release of these mediators is caused by cellular binding of specific immunoglobulin-E antibodies. This release can produce a life threatening condition. There is a 1.5% reported incidence of allergic reaction to isosulfan blue dye, which has been used to localize the lymphatic system in breast surgery. Here, we report a 57-year-old Thai female presenting with severe anaphylaxis reaction from isosulfan blue injection for sentinel lymph node procedure in breast cancer. To the best of our knowledge, this is the first case report in Thailand. In addition, prophylaxis treatment for reducing severity of this condition is discussed.**

Keywords: Anaphylaxis, Breast cancer, Isosulfan blue dye, Sentinel node biopsy

Case Report

A 57-year-old woman presented with a left breast mass at the lower outer quadrant. Core biopsy revealed invasive ductal carcinoma with positive estrogen receptor, negative progesterone receptor, and strongly positive HER2 receptor by immunohistochemistry. She had no known drug allergies and no significant co-illness except for mild hypertension. Her medication consisted of atenolol and amlodipine. Her treatment plan was to perform a simple mastectomy with sentinel lymph node biopsy (SLNB) guided by isosulfan blue dye. On physical examination, she was noted to have a Mallampati class 2 airway with normal heart and lung examination. After induction of anesthesia, an endotracheal tube was placed without adverse reaction. Isosulfan blue (5 ml) was injected intraparenchymally around the tumor mass. Approximately 4 minutes after the injection, the systolic blood pressure declined from 120 to 60 mmHg and was unresponsive to ephedrine. Soon after, the ECG showed short runs of ventricular tachycardia during which the blood pressure could not be measured. Following that, there was sinus bradycardia 45/min, and the patient was resuscitated with intravenous atropine (0.6 mg), adrenaline (0.5 mg) and dexamethasone (5 mg). Dopamine was administered intravenously at a rate of 10 mcg/kg/min. The systolic blood pressure rose to 60 mmHg and the ECG revealed sinus tachycardia with elevated ST

Correspondence address: *Doonyapat Sa-nguanraksa, Division of Head-Neck and Breast Surgery, Department of Surgery, Faculty of Medicine Siriraj Hospital, 2 Wanglang Road, Bangkok-noi, Bangkok 10700, Thailand; Telephone: +66 2419 8073; Fax: +66 2419 8929; E-mail: doonyapat051@yahoo.com*

segments in the anterior chest leads. The patient was transferred to the ICU for further resuscitation and achieved clinical improvement within 3 hours. Cardiac catheterization showed no significant coronary stenosis. Levels of cardiac enzymes and cortisol were within normal limits. She was transferred out of the ICU the next day without sequelae. A modified radical mastectomy was successfully done 2 weeks later.

Discussion

Anaphylaxis during anesthesia is often a clinical diagnosis presenting, in decreasing frequency, with cardiovascular collapse, angioedema, erythema, bronchospasm (severe or transient), urticaria and/or rash, gastrointestinal symptoms, and pulmonary edema[1]. Cardiovascular collapse without other clinical signs or symptoms occurs in 10% of reported cases of anaphylaxis[2]. Both anaphylactic and anaphylactoid reactions may present with similar findings, because both are the result of massive mast cell histamine release. However, the mechanism of the reactions differs. Anaphylaxis is the result of covalent binding of IgE drug-specific antibody to mast cells with subsequent release of intracellular contents. The reaction may be self-perpetuating. Anaphylactoid reactions are also the result of mast cell histamine release, but are dose-related rather than self-perpetuating. Moreover, they are not IgE antibody dependent. Rapid release of these mediators in large quantities is responsible for the mucosal edema and capillary leakage that can lead to fatal shock and asphyxia[3].

A review of the literature[4-6] reports three methods that may be used to confirm the diagnosis of anaphylaxis: 1) biochemical evidence of mast cell histamine release (plasma histamine), 2) radioimmunoassay or enzyme-linked immunoassay for drug-specific IgE serum antibody, and 3) skin-prick testing of the patient with the suspected agent(s). To accurately measure plasma histamine levels, the patient specimen must be collected within 15 to 60 minutes of the event and stored in ice. Serum or plasma tryptase levels and urine methylhistamine specimens require collection within 3 hours of the event. Radioimmunoassay or enzyme-linked immunoassay antibody testing is not available for all drugs and is not always positive when serum tryptase levels are elevated and skin testing is reactive[4]. A skin-prick test allows either definite or probable identification of the causative agent in approximately 75% of cases[6]. The cause-effect relationship is often determined on the basis of clinical observations rather than laboratory tests[7,8].

Isosulfan blue, a rosaniline dye of the triphenylmethane type, is the 2,5-disulfonated isomer of patent blue dye. This dye, widely used during the course of SLNB, is the only dye of its type approved for lymphatic visualization by the Food and Drug Administration. After subcutaneous or intraparenchymal administration, isosulfan blue is selectively picked up by the lymphatic vessels, thus delineating the lymphatic system draining the area of injection. Fifty percent of isosulfan blue weakly binds to interstitial proteins, mostly albumin. Because interstitial protein is carried almost exclusively by lymphatics, visualization of SLNs may be due to a protein-binding phenomenon[8-10]. In our case, elevated serum tryptase was used to confirm the diagnosis of anaphylaxis. In addition, anesthetic agents used in patients who develop anaphylactic reactions, such as opiates, propofol, and isoflurane, are extremely rare causes of anaphylaxis during general anesthesia (1 in 60,000 cases)[11]. Thus, the relationship between the injection of isosulfan blue and the clinical response makes this agent the most probable cause.

The focus when anaphylaxis occurs during anesthesia should be on prompt and aggressive treatment in order to prevent an adverse outcome[7,8]. The first line of therapy involves the discontinuation of all anesthetic agents, administration of 100% oxygen, rapid infusion of large amounts of intravenous fluids, and prompt administration of epinephrine (0.1 to 0.3 mg intravenously given over 10 minutes). The second line of therapy includes H1-blockers (diphenhydramine hydrochloride 50 mg intravenously) and corticosteroids (methylprednisolone 125 mg intravenously). For refractory hypotension in patients receiving beta blockers, glucagon (1-mg ampoule) constitutes a third line of treatment[11].

After resolution of the acute episode, patients should be closely monitored for at least 24 hours as late reactions can be seen for several hours after surgery. This so-called biphasic anaphylactic reaction could be caused by a late systemic release of tissue depots of the antigen or by recruitment of late inflammatory mediators[10]. Therefore, when anaphylactic reactions occur during lymphatic mapping, we recommend close in-hospital observation for at least 24 hours after the

event. We monitored our patient for more than 24 hours, and there was no biphasic reaction. The incidence of allergic reaction to isosulfan blue dye ranges from 0.7% to 1.9%[7,12-14].

Longnecker et al.,[12] proposed premedication with histamine receptor (H1-and H2-) blockers (diphenhydramine and either cimetidine or ranitidine) before isosulfan blue dye administration to limit the reaction to the dye. Results of a surgical prospective clinical practice protocol from MD Anderson Cancer Center[10] showed a reduction in severe adverse reactions to blue dye in patients who received prophylaxis (0.5%), as compared to those without prophylaxis (8.3%). The protocol used a regimen composed of a glucocorticoid and histamine receptor blockers (100 mg of hydrocortisone or 4 mg of dexamethasone, 50 mg of diphenhydramine, and 20 mg of famotidine intravenously) just before or at induction of anesthesia in patients with breast carcinoma undergoing SLNB with isosulfan blue dye. Although the prophylactic regimen did not appear to reduce the incidence of adverse reactions significantly, the severity of reactions was decreased.

In our experience of more than 5,000 cases from year 2000 to the present, only one case developed severe anaphylactic reactions to isosulfan blue. Montgomery et al.,(15) reported 39 adverse reactions to isosulfan blue dye in a series of 2,392 patients (1.6%) undergoing mapping for breast carcinoma. Only nine cases of the adverse reactions were classified with Grade 3 severity. Neither study reported any deaths from dye injection.

Conclusion

In conclusion, SLNB is rapidly becoming the standard of care for identifying nodal metastasis in breast cancer. Nonetheless, anaphylactic reactions to isosulfan blue dye during the course of SLNB for breast cancer could have serious consequences, although their incidence is relatively low. As part of the informed consent process, patients should be informed of this potentially life-threatening allergic reaction. Surgeons performing lymphatic mapping must be aware and prepared to aggressively treat anaphylactic reactions that may result from this compound. However, routine prophylactic premedication with glucocorticoids and antihistamines is not recommended in Thai patients because this reaction is extremely rare.

Consent

Informed written consent for publication was obtained from the patient prior to collecting of data.

Conflicts of Interest

The authors declare that they have no conflict of interests.

Authors' Contributions

CO, and DS contributed to the collection of information and writing of the manuscript. DS contributed to the writing and final approval of the manuscript.

REFERENCES

1. Fisher M, Baldo B. Anaphylaxis during anesthesia: current aspects of diagnosis and prevention. Eur J Anaesthesiol 1994;11:263-84.
2. Toh K, Deacock S, Fawcett W. Severe anaphylactic reaction to cisatracurium. Anesta Analg 1999;88:462-4.
3. Wan P. Anaphylaxis. BMJ 1998;316:1442-5.
4. Gueant J, Aimone-Gastin I, Namour F, et al. Diagnosis and pathogenesis of the anaphylactic and anaphylactoid reactions to anaesthetics. Clin Exp Allergy 1998;28 (suppl 4): 65-70.
5. Pepys J, Pepys E, Baldo B, Whitwam J. Anaphylactic/ anaphylactoid reactions to anaesthetic and associated agents; skin prick tests in aetiological diagnosis. Anaesthesia. 1994;49:470-5.
6. Laroche D, Vergnaud M, Sillard B, et al. Biochemical markers of anaphylactoid reactions to drugs : Comparison of plasma histamine and tryptase. Anesthesiology 1991;75:945-9.
7. Hirsch J, Tisnado J, Cho S, Bechley M. Use of isosulfan blue for identification of lymphatic vessels; experimental and clinical evaluation. Am J Roentgenol 1982;139:1061-4.
8. Leong SP, Donegan E, Heffernon W, et al. Adverse reactions to isosulfan blue during selective sentinel lymph node dissection in melanoma. Ann Surg Oncol 2000;7:361-6.
9. Lyew MA, Gamblin TC, Ayoub M. Systemic anaphylaxis associated with intramammary isosulfan blue injection used for sentinel node detection under general anesthesia. Anesthesiology 2000;93:1145-6.
10. Kuerer HM, Wayne JD, Ross MI. Anaphylaxis during breast cancer lymphatic mapping. Surgery 2001;129:119-20.
11. Bochner BS, Lichtenstein LM. Anaphylaxis. N Engl J Med 1991;324:1785-90.
12. Longnecker SM, Guzzardo MM, Van Voris LP. Life-threatening

anaphylaxis following subcutaneous administration of isosulfan blue 1%. Clin Pharm 1985;4:219-21. Write to the Help Desk NCBI | NLM | NIH Department of Health & Human Services Privacy Statement | Freedom of Information Act | Disclaimer.

13. Albo D, Wayne JD, Hunt KK, et al. Anaphylactic reactions to isosulfan blue dye during sentinel lymph node biopsy for breast cancer. Am J Surg 2001;182:393-8.
14. Cimmino VM, Brown AC, Szocik JF, et al. Allergic reactions to isosulfan blue during sentinel node biopsy—a common event. Surgery 2001;130:439-42.
15. Montgomery LL, Thorne AC, Van Zee KJ, et al. Isosulfan blue dye reactions during sentinel lymph node mapping for breast cancer. Anesth Analg 2002;95:385-8.

บทคัดย่อ **อาการแพ้อย่างรุนแรงต่อการฉีดสารไอโซเซาฟานบลูในการทำการตรวจหาต่อมน้ำเหลืองเซนติเนลในการผ่าตัดมะเร็งเต้านม: รายงานผู้ป่วยรายแรกของประเทศไทย**

ชยนุช โอเจริญรัตน์, ดุลยพัฒน์ สงวนรักษา, พ.บ., ปร.ด.

สาขาวิชาศัลยศาสตร์ศีรษะ คอและเต้านม ภาควิชาศัลยศาสตร์ คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล กรุงเทพมหานคร 10700

อาการแพ้อย่างรุนแรงที่เกิดจากการแพ้สาร ทำให้มีปัญหาในการหายใจและความดันตกได้ ซึ่งเป็นผลจากการหลั่งสารฮีสตามีนจากมาสเซลล์และบาโซฟิลล์ โดยเฉพาะการเกิดกับการใช้สารไอโซเซาฟานบลู กับการผ่าตัดต่อมน้ำเหลืองเซนติเนลในผู้ป่วยมะเร็งเต้านม แม้มีเพียง 1.5% แต่ก็สามารถเกิดได้ และมีอันตรายถึงชีวิตถ้ารักษาได้ไม่ทันท่วงที บทนิพนธ์นี้ได้รายงานผู้ป่วยหญิงอายุ 57 ปีที่มารับการผ่าตัดมะเร็งเต้านมและใช้สารไอโซเซาฟานบลูและมีอาการแพ้สารตัวนี้อย่างรุนแรง นอกจากนี้ยังได้กล่าวถึงแนวทางการดูแลรักษาที่เหมาะสมเพื่อช่วยลดความรุนแรงของอาการแพ้ที่เกิดขึ้นจากสารนี้