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Original Article

Reconstruction of Soft Tissue Defects of Leg with Local Fasciocutaneous Flaps

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Background: **Reconstruction of soft tissue defects of the leg remains challenged. The purpose of this study was to evaluate the treatment of soft tissue defects of leg with local fasciocutaneous flaps.**

Patients and Methods: **Ten patients underwent the reconstruction of leg defects. Local fasciocutaneous flaps were performed to reconstruct leg defects in all patients at Buriram Hospital from July 2014 to March 2016.**

Results: **Seven of ten flaps survived completely without complication. Three patients (30%) had partial flap necrosis but could be resolved by debridement and split-thickness skin graft. The follow-up time ranged from 1-8 months. Flaps and skin graft on the donor site survived completely.**

Conclusion: **Using the local fasciocutaneous flaps to reconstruct leg and ankle defects are safe and reliable procedure with a high success rate, however partial flap necrosis remains an important complication.**

Keywords: **Leg reconstruction, local fasciocutaneous flap**

INTRODUCTON

Management of soft tissue defects of the lower limb remains difficult especially the area with exposure of bone, tendon or vessels. Wounds in the leg and ankle regions remains a frequent and challenging problem. The choices of soft tissue reconstructions include local muscular based flap, local fasciocutaneous flaps and free flaps[1].

Recently, Chan et al. reported retrospective review comparing fasciocutaneous and muscle flaps of soft tissue reconstruction for open fractures of the lower limb. They concluded that similar numbers of patients achieved bony union and were able to walk unaided after two years[2].

The main advantages of local fasciocutaneous flaps over muscle flaps and free flap are easy to harvest

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and less donor site morbidity due to the preservation of the muscular structure and function. Ayestaray et al. presented a classification of propeller flaps and clinical application of propeller flaps for lower limb reconstruction[3]. Pignatti et al. showed the result of propeller flaps in soft tissue defects of the legs in six patients. They concluded that propeller flaps are an excellent choice to resurface complex soft tissue defects of the leg[4]. Brave et al. reported defect coverage in 21 patients with free style local perforator flaps. All flaps survived. They concluded that the concept of freestyle local perforator flaps represents a safe, versatile and reliable surgical procedure[5]. Wallace et al.[6] and Lecours et al.[7] showed their experience with freestyle perforator flaps. They concluded that freestyle pedicle perforator flaps can provide a simpler alternative to freeflaps. Vergara-Amador[8], Chai et al.[9], Morgan et al.[10], Chen et al.[11], and Olawoye et al.[12] reported their experience of the distally based sural flap for ankle and foot reconstruction. They concluded that this flap is a good alternative to free flaps for soft tissue defects in the distal area of the leg and foot.

The objective of this study was to present my experience of utilization of local fasciocutaneous flaps for soft tissue reconstruction of the leg.

Materials and Methods

Medical records of the patients who were diagnosed with soft tissue defect of leg and ankle at Buriram Hospital from July 2014 to March 2016 were reviewed. Patient characteristics including age, etiology of defect, site of defect, size of defect, type of flap, size of flap, complication and follow up period were recorded. Ten patients, eight men and two women, underwent the procedures of the local fasciocutaneous flap transfer for coverage of soft tissue defects over the leg at Buriram Hospital. The average age of the patients was 44 years (ranged from 20 to 66 years). The cause of soft tissue defects included trauma in five patients, thermal burn injury in one patient, electrical injury in one patient, shortgun wound in one patient and chronic ulcer in two patients. Among them, complications with bone, joint, tendon or fixation materials exposure were seen in all patients. The design of flaps was equal or slightly larger than the defect. Follow up time ranged from 1 month to 8 months, with an average of 3.80 months. Details of these patients are showed in Table 1.

Table 1 Patient Demographic Data

Patients	Age (years)	Etiology	Site of defect	Size of Defect (cm)	Type of flap	Size of Flap (cm)	Complication	Follow-Up (months)
1	56/M	Thermal burn	Medial malleolus and dorsum of foot	7 × 20	Reverse sural fasciocutaneous flap	7 × 20	-	8
2	40/M	Chronic ulcer	Anterolateral ankle	5 × 6	Propeller flap	6 × 30	Partial necrosis	2
3	62/F	Chronic ulcer	Anterolateral ankle	7 × 9	Propeller flap	9 × 17	Partial necrosis	5
4	20/M	Trauma	Mid-tibia	3 × 7	Freestyle perforator transposition flap	3 × 10	-	2
5	26/M	Shortgun wound	Distal tibia	8 × 8	Reverse sural fascio-cutaneous flap	9 × 9	-	4
6	65/F	Trauma	Medial malleolus transposition flap	8 × 10	Freestyle perforator	8 × 18	Partial necrosis	1
7	50/M	Electrical injury	Anterior ankle	8 × 8	Reverse sural fascio-cutaneous flap	8 × 8	-	6
8	32/M	Trauma	Mid-tibia	4 × 5	Superiorly based sural fasciocutaneous flap	6 × 6	-	2
9	23/M	Trauma	Distal tibia	7 × 8	Freestyle perforator	8 × 27	-	5
10	66/M	Trauma	Distal tibia	6 × 15	Reverse sural fascio-cutaneous flap	6 × 10	-	3

Results

The reconstructions were performed as follows: two propeller flaps to cover defects of ankle area; four reverse sural fasciocutaneous flaps to cover ankle or distal tibial defects; one superiorly based sural fasciocutaneous flap to cover defect of mid-tibia; and three free style perforator transposition flaps to cover defects of mid-tibia, medial malleolus and distal tibia. In all cases, the donor site was closed with a split-thickness skin graft.

Seven of ten flaps (70%) survived completely without complications. In 3 patients (30%), superficial partial necrosis of distal flap occurred due to local venous congestion and the wound healed with debridement and split-thickness skin graft.

The reconstruction has been stable in all cases during the follow-up period (1-8 months). All donor sites healed uneventfully.

Case Reports

Patient 2

A 40-year-old man was admitted with a chronic ulcer on his right anterior ankle. Tissue biopsy was obtained and showed no malignancy. Excisional debridement was performed to convert chronic wound into acute wound. The wound was 5 × 6 cm in size, involving the anterolateral ankle and dorsum of the foot, with exposure of tendon. The defect was covered by the propeller flap[3,4]. The flap was 6 × 30 cm in size. The donor site was covered by split-thickness skin graft. I tried to preserve more tissue for saving skin graft tissue, but unfortunately partial flap necrosis had occurred on the proximal site which had previous unhealthy tissue. I resolved this problem by excision of necrotic tissue and a split-thickness skin graft. The final result, after two months, was satisfactory (Figure 1), and the patient was able to ambulate and return to work.

Patient 4

A 20-year-old man sustained a traffic accident injury on his left leg, resulting in an open fracture of the tibia and a soft tissue defect at mid-tibial area, and measured 3 × 7 cm in size. After treatment of tibial fracture by external fixation, a 3 ×10 cm perforator transposition flap based on freestyle local perforator flap concept[5-7] was transferred to the defect, using hand held doppler ultrasound to locate the perforator. The donor site was covered by split-thickness skin graft. Both flap and skingraft on the donor site healed without complication (Figure 2).

Patient 5

A 26-year-old man suffered a soft tissue defect over the distal tibia and both tibia and fibula were fractured by a short gun injury. After debridement and external fixation of both bones by orthopedic surgeon, the defect was covered with a reverse fasciocutaneous flap[8-12]. The flap was 9 × 9 cm in size. The donor site was covered by spit-thickness skin graft. The wounds healed without complication (Figure 3).

Discussion

The primary goal of surgical reconstruction of the lower extremity wound is to restore or maintain function. Different options have been described throughout the history for soft tissue reconstruction of leg such as pedicled fasciocutaneous flaps, muscle flaps and free flaps. In general, flaps used to cover the leg have common requirements including skin match with the recipient, larger size of skin paddle, no sacrifice of any major artery, and minimal donor site morbidity. The advantages of local fasciocutaneous flap over muscle flap and free flap are easy to harvest, not required microsurgical skill and no significant functional loss of donor site. Local fasciocutaneous flaps are very useful to reconstruct soft tissue defects in the leg area because of their versatility and reliability, based on a constant vascular anatomy pattern making it unnecessary to perform preoperative vascular examination. Special surgical skills are not needed.

I prefer the local fasciocutaneous flap to reconstruct soft tissue defects of the leg. The outcome revealed 100% flap survival. However, partial flap necrosis occurred in 30% of cases which were resolved by excision and split-thickness skin graft. All patients had good result of defect coverage, bone union and ambulation.

The author presented small series of patients who were treated for soft tissue defects of leg and ankle with local fasciocutaneous flaps. The concept is simple and technique of flap harvesting is easy in all cases, with short surgical time and minimal blood loss. No sacrifice

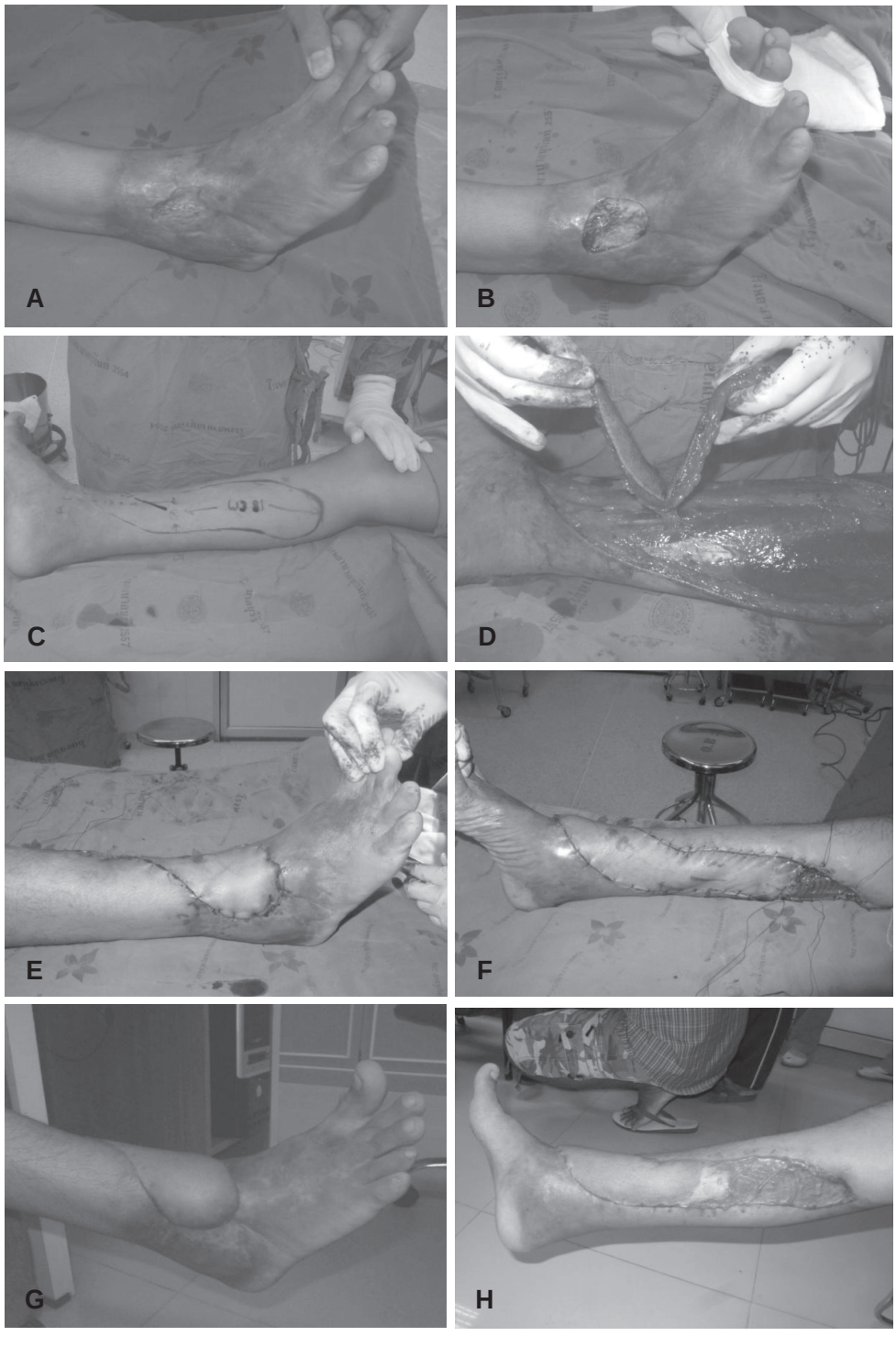

Figure 1 (A) Chronic ulcer over anterolateral ankle. (B) Soft tissue defect after debridement. (C) A design of propeller flap and marking of perforator by hand held Doppler ultrasound. (D) Flap harvesting and intraoperative view of septocutaneous perforator. (E) The flap was rotated 180° to cover the defect. (F) Donor site was covered by spit-thickness skin graft. (G,H) Two months after surgery.

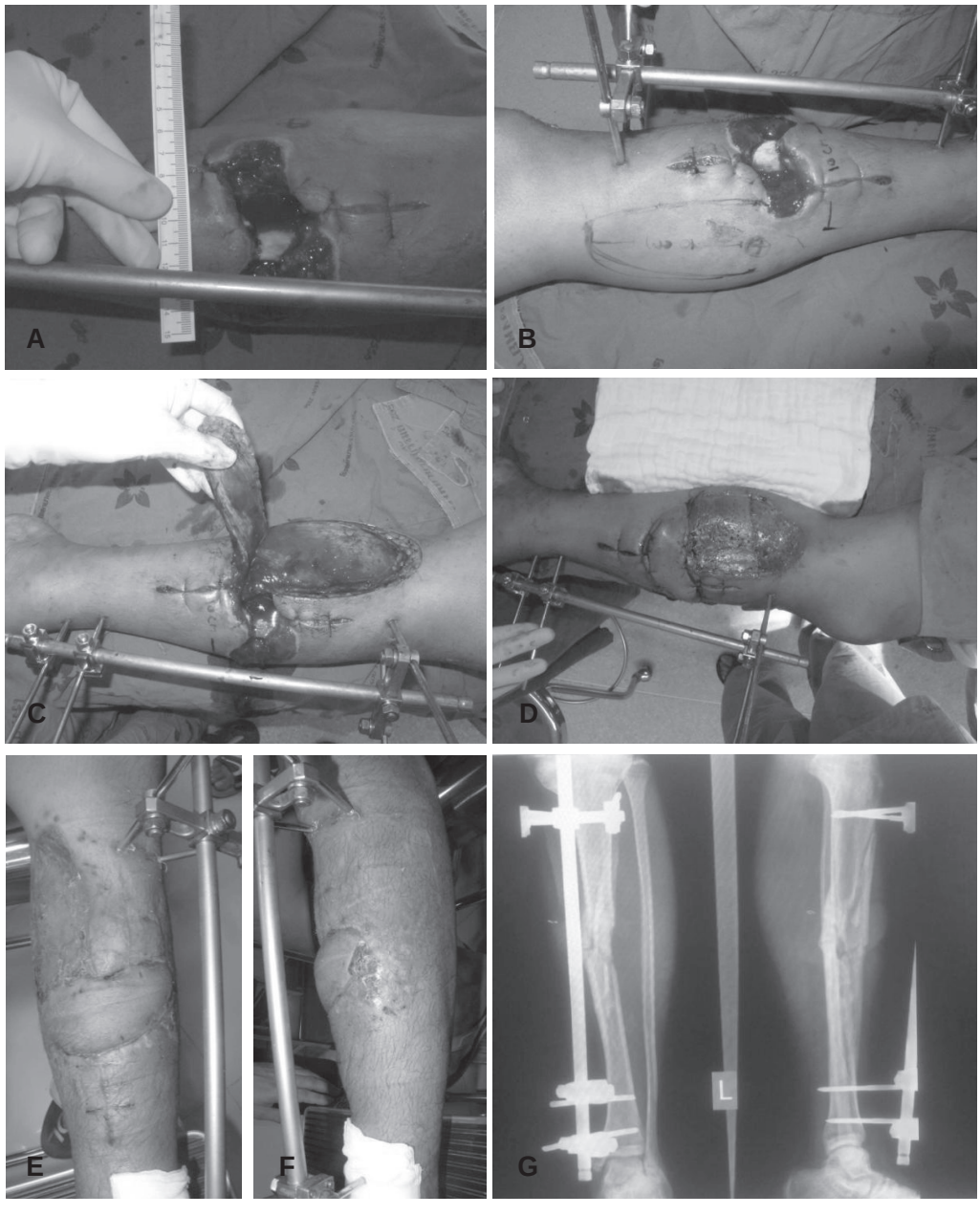

Figure 2 (A) Preoperative view. (B) Marking perforator by hand held Doppler ultrasound flap design. (C) Elevation of perforator transposition (D) Immediate after operation, the defect was covered by perforator transposition fasciocutaneous flap and donor site was covered by spit-thickness skin graft. (E, F) View at 2 months follow-up complete survival of flap and skin graft on the donor site. (G) Film left leg at 2 months after surgery

of main vessels is required. Local fasciocutaneous flaps for reconstruction of leg defects provide an excellent result of reconstruction.

Conclusion

Based on my own experience, the local fasciocutaneous flaps for leg and ankle defects are safe and reliable procedure with a high success rate, however, partial flap necrosis remains an important issue. I concluded that pedicle fasciocutaneous flaps should be considered the main choice of reconstruction of soft tissue defects. Free flap would be salvaged in more complex cases when none of these flaps could be performed.

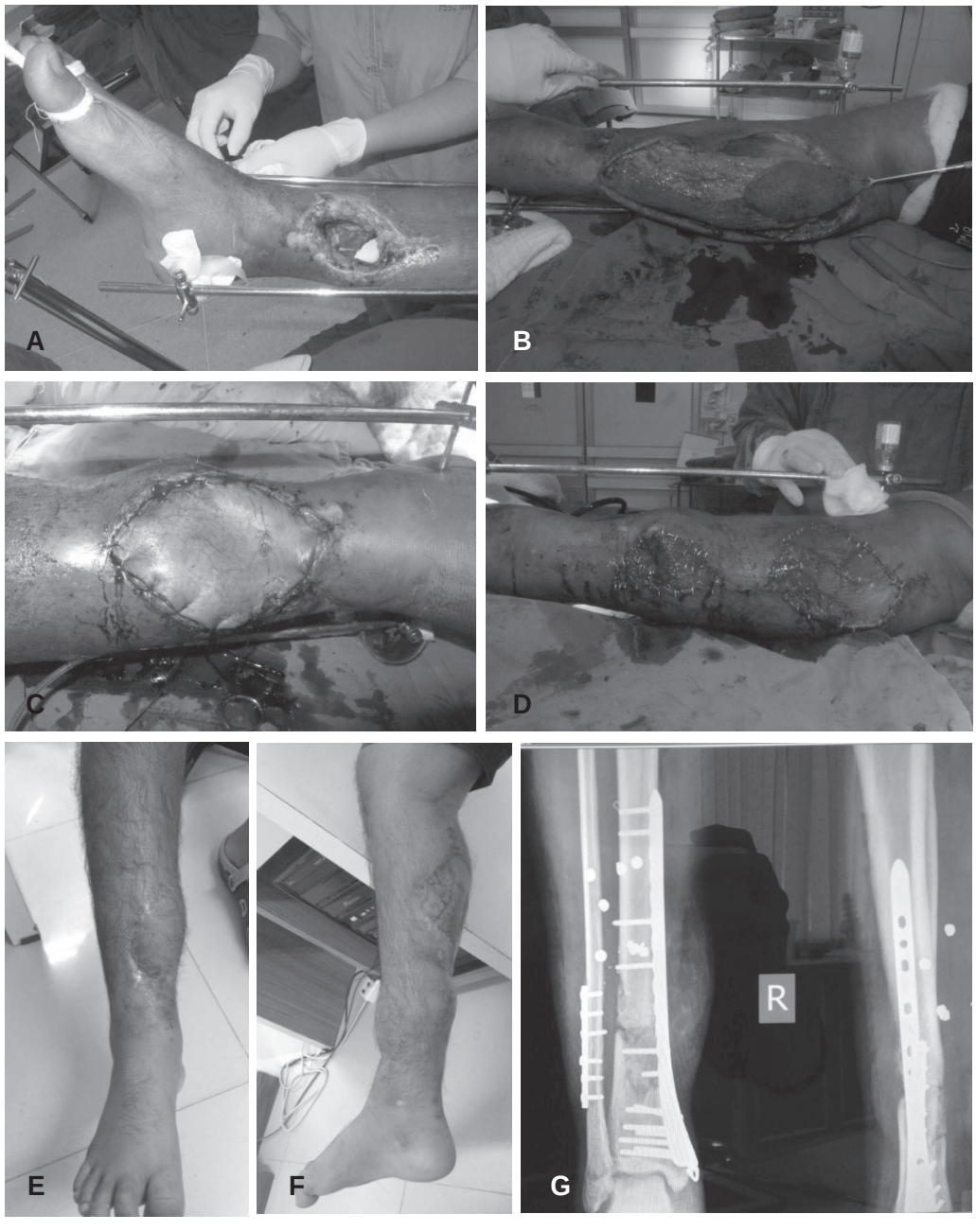

Figure 3 (A) Preoperative view. Distal tibia defect after debridement and external fixation by orthopedic surgeon. (B) A reverse sural fasciocutaneous flap was harvested from the upper calf. (C) The defect was covered with the fasciocutaneous flap. (D) The donor site was covered by split-thickness skin graft. (E, F, G) View and film at 4 months after surgery.

Acknowledgement

The present study was supported by the Center of Cleft Lip-Cleft Palate and Craniofacial Deformities, Khon Kaen University in association with Tawanchai Project.

What is already known on this topic?

There are many choices of soft tissue reconstructions of the leg include local muscular based flap, local fasciocutaneous flaps and free flaps.

What this study adds?

Local fascio cutaneous flaps for leg and ankle defects are safe and reliable procedure with a high success rate. It is an alternative to free flap or muscular flap transposition in the proper circumstances.

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บทคัดย่อ

การผ่าตัดเสริมสร้างเนื้อเยื่อที่ขาดหายไปบริเวณขาด้วยแผ่นเนื้อชนิด fasciocutaneous แบบมีขั้วจากบริเวณข้างเคียง

เปรมศักดิ์ ศักรินพานิชกุล

กลุ่มงานศัลยกรรม โรงพยาบาลบุรีรัมย์

บทนำ: การผ่าตัดเสริมสร้างเนื้อเยื่อที่ขาดหายไปบริเวณขายังคงเป็นเรื่องที่ท้าทายที่น่าสนใจ วัตถุประสงค์ของการศึกษานี้เพื่อศึกษาประเมินการผ่าตัดเสริมสร้างเนื้อเยื่อที่ขาดหายบริเวณขาด้วยการใช้แผ่นเนื้อชนิด fasciocutaneous แบบมีขั้วจากบริเวณข้างเคียง

รูปแบบการศึกษา: การศึกษาเชิงพรรณนา

ผู้ป่วยและวิธีการศึกษา: การศึกษาในผู้ป่วย 10 คนที่ได้รับการผ่าตัดเสริมสร้างเนื้อเยื่อที่ขาดหายไปบริเวณขาไป ศัลยแพทย์ตกแต่งได้ทำการผ่าตัดเสริมสร้างเนื้อเยื่อที่ขาดหายไปบริเวณขาทั้งหมด 10 คนด้วยเทคนิคเคลื่อนย้ายแผ่นเนื้อชนิด fasciocutaneous แบบมีขั้วจากบริเวณข้างเคียง การผ่าตัดทั้งหมดทำในโรงพยาบาลบุรีรัมย์ช่วงเดือนกรกฎาคม 2557-มีนาคม 2559

ผลการศึกษา: จากการศึกษาพบว่าผู้ป่วย 7 คนจากทั้งหมด 10 คน แผ่นเนื้อที่ได้รับการโยกย้ายมาสามารถอยู่รอดได้โดยสมบูรณ์โดยไม่มีภาวะแทรกซ้อนใด ๆ เกิดขึ้น ส่วนอีก 3 คนคิดเป็น 30% พบว่าแผ่นเนื้อที่โยกย้ายมามีเนื้อเยื่อบางส่วนขาดเลือด แต่สามารถแก้ไขได้ด้วยการตัดเนื้อเยื่อที่ตายออกและปิดแผลด้วยการปลูกถ่ายผิวหนัง (split-thickness skin graft) ระยะเวลาการติดตามการรักษาอยู่ระหว่าง 1-8 เดือน ผู้ป่วยทุกรายแผลบริเวณเนื้อเยื่อที่ขาดหายไปและบริเวณที่โยกย้ายแผ่นเนื้อมาหายดีทุกคน

สรุปผลการศึกษา: การใช้แผ่นเนื้อชนิด fasciocutaneous แบบมีขั้วจากบริเวณข้างเคียงในการผ่าตัดเสริมสร้างเนื้อเยื่อที่ขาดหายไปบริเวณขาและข้อเท้าเป็นการผ่าตัดที่ปลอดภัยและได้รับการยอมรับ เนื่องจากมีอัตราผลสำเร็จของการผ่าตัดสูง อย่างไรก็ตามการขาดเลือดและการเกิดเนื้อตายบางส่วนของแผ่นเนื้อที่โยกย้ายมายังคงเป็นภาวะแทรกซ้อนที่สำคัญของหัตถการนี้

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Original Article

Santichatngam's Colonic Injury Prediction Score (SCOPES)

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Abstract

Background: **Colonic injury is one of the common intra-abdominal organ injuries. The management of colonic injury has undergone many radical changes in the last few decades from all diversion to selected primary repair. So far, there has been no clinical predictive score for selection of treatment in patients with colonic injury.**

Objective: **To develop the clinical predictive score for treatment selection in patients with colonic injury.**

Patients and Methods: **Patients with colonic injury who were treated at Maharat Nakhon Ratchasima Hospital were recruited from Oct 1, 2008 to Sep 30, 2014. Retrospective chart review was performed.**

Results: **I developed the Santichatngam's Colonic Injury Prediction Score (SCOPES) using the following variables: weights; delayed time to surgery >6 hours (+2.56); gross fecal contamination (+4.19); left-sided colonic injury (+2.32); and duodenal/ureteral injury (+3.48). The positive SCOPES (score > 4.87 by >2 factors) had the following accuracy indices: sensitivity 88.24%; specificity 83.51%; likelihood ratio for positive results 5.35; and likelihood ratio for negative results 0.14. In validation phase, the probability of the SCOPES after a positive score was 84.25% for diversion and probability of the SCOPES after a negative score was 87.72% for primary repair.**

Keywords: **Clinical predictive score, colonic injury**

Introduction

Colonic injury is one of the common intra-abdominal organ injuries and 90% of colonic injury is caused by penetrating injury. Penetrating colonic injury is the second most common penetrating intra-abdominal organ injury following the penetrating small bowel injury. In contrast, in blunt abdominal injury, colonic injury is found around 2-5%[1-7]. For penetrating colonic injury, 75% is from gunshot wound and 25% from stab wound[8].

Gunshot abdomen with colonic injury accounts for 25-30% of all gunshot abdominal injuries and it causes low mortality rate, about 2-12%[9]. But colonic injury with associated injuries and complications can increase mortality rate[10-11]. The good outcome depends on the length of time from injury to surgery and the choice of proper management[12].

The management of colonic injury has undergone many radical changes in the last few decades. From 1951 to 2003, new era of treatment of colonic injury that had been changed from all diversion to selected primary repaired can reduce the colon-related mortality

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from 90 to 1.3%[8,12-22]. Pros and cons evidences about indication for considering the choice of treatment include delay time to surgery (>6 hours), shock (mean arterial blood pressure (MAP) < 65 mmHg), gross fecal contamination, intraperitoneal blood > 1 L, left-sided colonic injury, severe colonic injury, organ injury > 2 systems, abdominal wall loss, and massive blood transfusion. Only duodenal and ureteral injuries are contraindication for primary repaired[2-5,8,12-14,20,21-34].

Objective

To develop the clinical predictive score for treatment selection in patients with colonic injury.

Materials and Methods

Study population

Colonic injury patients (ICD 10th: S365) were recruited from Maharat Nakhon Ratchasima Hospital (MNRH) from October 1, 2008 to September 30, 2013 (5 years) for patient characteristics and from October 1, 2013 to September 30, 2014 for the development of clinical predictive score.

Data collections

Demographic data was reviewed from medical records including type of injuries, sex, age, underlying diseases, time to operation (hours), preoperative and intraoperative blood pressure, Colonic Injury Score (CIS) according to American College of Surgeons (ACS), degree of fecal contamination, blood transfusion in the first 24 hours, sites of colonic injury, number of organ injuries, abdominal wall loss, duodenal/ureteral injury, damage control surgery, operative time (hours), complications and mortality. This study was approved by Ethical Committee Board of MNRH.

Statistical analysis

Multiple logistic regression was used to analyze the association of clinical variables and diversion. Each variable would be included in the model if it was found to be associated with diversion at $p < 0.1$ in univariate analysis. For each model, a backward stepwise procedure was applied to remove variables that were not associated with diversion ($p > 0.05$). For each score, a receiver operating characteristic (ROC) curve was drawn; the area under ROC curve was estimated. We compared the area under ROC curves for each

Table 1 Characteristics of the patients in diversion and primary repair groups (n =230)

	Group		*p* -value
	Diversion (n = 26) (%)	Primary repaired (n = 204) (%)	
Age ≥ 40 years	10 (38.5)	74 (36.5)	0.82
Underlying disease	2 (7.7)	10 (4.9)	0.63*
Gunshot or shotgun injuries	4 (15.4)	21 (10.3)	0.49*
Delayed time to surgery ≥ 6 hours	5 (19.2)	15 (7.4)	0.06*
Surgeon (staff)	8 (30.8)	31 (15.2)	0.06*
Preoperative shock	1 (3.8)	7 (3.4)	0.91*
Intraoperative shock	1 (3.8)	1 (0.5)	0.21*
Gross fecal contamination	23 (88.5)	37 (18.1)	< 0.001
Intraperitoneal blood ≥ 1 L	10 (38.5)	21 (10.3)	0.001*
Left side colonic injury	19 (73.1)	87 (42.6)	0.003
CIS ≥ 4	11 (42.3)	18 (8.8)	<0.001*
Organ injury ≥ 2 systems	11 (42.3)	18 (8.8)	<0.001*
Abdominal wall loss	1 (3.8)	1 (0.5)	0.21*
Duodenal/ureteral injury	10 (38.5)	13 (6.4)	<0.001*
Damage control surgery	3 (11.5)	5 (2.5)	0.049*
Operative time ≥ 4 hours	5 (19.2)	4 (2.0)	0.001*
Blood transfusion ≥ 4 unit in first 24 h	2 (7.7)	8 (3.9)	0.32*

*Fisher's exact test

Table 2 Factors associated with diversion: multiple logistic regression analysis in the derivation sample (n=160)

Factor	Coefficient	SE	*p*-value	OR(95%CI)
Delayed time to surgery > 6 hours	2.56	1.22	0.037*	12.92 (1.17-142.17)
Gross fecal contamination	4.19	1.05	<0.001*	66.11 (8.37-522.18)
Left side colonic injury	2.32	0.93	0.013*	10.13 (1.63-62.86)
Duodenal/ureteral injury	3.48	1.03	0.001*	32.44 (4.31-243.97)

*$p < 0.05$

score. To develop a clinical predictive score, 70% of patients from October 1, 2008 to September 30, 2013 were recruited into the equation set score's performance using ROC curve analysis in the derivation phase. The rest (30%) were combined with the patients recruited from October 1, 2013 to September 30, 2014 to test the equation in the validation phase.

Results

From October 1, 2008 to September 30, 2013, 230 patients with colonic injury were consecutively recruited. Univariate analysis was performed and shown in Table 1. Seven variables were analyzed with multiple logistic regression with derivation sample (n = 160). Four variables were associated with diversion in multivariate model (delay time to surgery > 6 hours, gross fecal contamination, left-sided colonic injury, and duodenal/ureteral injury) (Table 2). The Santichatngam's Colonic Injury Prediction Score (SCOPES) was developed using these variables in derivation sample as follows: weights; delay time to surgery > 6 hours (+2.56); gross fecal contamination (+4.19); left-sided colonic injury (+2.32); and duodenal/ureteral injury (+3.48) (Table 3). The area under the ROC curve was 0.9042 in the derivation and 0.9391 in the validation samples (Figure 1). The positive SCOPES (score > 4.87 by > 2 factors) had the following accuracy indices: sensitivity 88.24%; specificity 83.51%; likelihood ratio (LR) for positive results 5.35; and LR for negative results 0.14 in validation phase (Table 4).

The area under the ROC curve was 0.9042 in the derivation and 0.9391 in the validation samples.

Factors with $p < 0.1$ would be calculated with multiple logistic regression (delayed time to surgery,

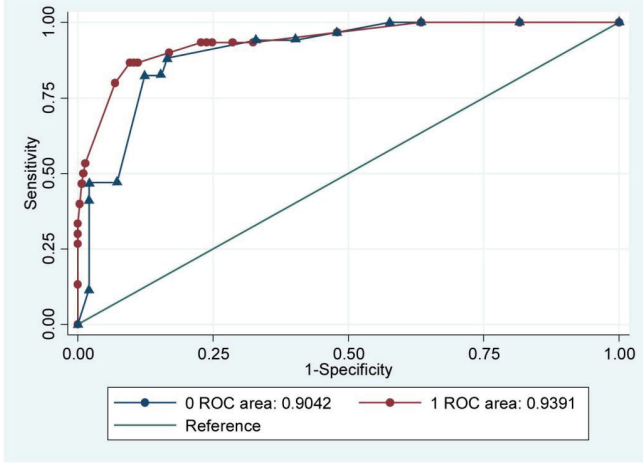

Figure 1 Receiving operating characteristic (ROC) curve for SCOPES

Table 3 Final variable and its assigned scores in SCOPES

Factors	Scoring
Delayed time to surgery >6 hours	
Yes	2.56
No	0
Gross fecal contamination	
Yes	4.19
No	0
Left-sided colonic injury	
Yes	2.32
No	0
Duodenal/ureteral injury	
Yes	3.48
No	0
Total score	**0-12.55**

Table 4 Score of diversion according to SCOPES category in derivation and validation phases

Score	Probability of diversion	Factors	Derivation (n=160)				Validation* (n=114)			
			Sensitivity	Specificity	LR+	LR-	Sensitivity	Specificity	LR+	LR-
>4.87	High	2 factors	86.67	88.97	7.8	0.1	88.24	83.51	5.3	0.1
7					5	5			5	4

*≥ 2 factors are the indication for diversion

Post test odd for SCOPES positive = 84.25%

Post test odd for SCOPES negative = 12.28%

surgeon, gross fecal contamination, intraperitoneal blood > 1 L, left-sided colonic injury, CIS ≥ 4, duodenal/ureteral injury).

Operative time ≥ 4 hours and damage control surgery were excluded because these factors were the surrogated outcome.

A score with range of 0-12.55 with a cut off at 4.87(> 2 factors) is indication for diversion.

Discussions

This study aimed to develop the colonic injury predictive score affecting the treatments of colonic injury, diversion or primary repair. I found the more important factors with statistical significance in the diversion treatment group than the primary repair group, including the delayed time to surgery > 6 hours ($P = 0.037$), gross fecal contamination ($p < 0.001$), left-sided colonic injury ($p < 0.013$) and duodenal/ureteral injury ($p < 0.001$). The delayed time to surgery is consistent with studies by Stone et al.[4,25], and George et al.[3], but vetoed by the study of Kamwendo et al.[35]. Gross fecal contamination was consistent with studies by Stone et al.[4,25], Demetriades et al. [21], Hunt et al.[23], Nelkin et al.[30], George et al.[31], and Ross et al.[36], but vetoed by studies by Burch et al.[6] and Adkins et al.[27]. Left-sided colonic injury is consistent with studies by Hunt et al.[23] but vetoed by studies by Thomson et al.[26]. Duodenal/ureteral injury is consistent with studies by Huber et al.[20].

The cut point of SCOPES at 4.87 by factors > 2 has the sensitivity 88.24%, specificity 83.51%, positive LR 5.35 which is moderately increased in the likelihood of disease and negative LR 0.14 which is moderately decreased in the likelihood of disease (validation phase). The probability of SCOPES after a positive score is 84.25% for diversion whereas the probability of SCOPES after a negative score is 87.72% for primary repair. I believe the SCOPES is the first novel study of the attempt of the systematic approach to treatment in the patients with colonic injury. The SCOPES has inherent advantages over the human clinical decision making. Firstly, the SCOPES can accommodate much more factors into consideration than the human brain. Secondly, the SCOPES will always give the consistent result whereas the human clinical judgment has been shown to have varied result in both consistency and disparity, especially with less experienced surgeons. Finally, the SCOPES has been shown to appear more accurate than clinical judgment alone.

Conclusions

Factors affecting treatment diversion or primary repair in colonic injury are the delayed time to surgery, gross fecal contamination, left-sided colonic injury and duodenal/ureteral injury. I have generated a novel score: SCOPES by factors > 2 that has the sensitivity 88.24%, specificity 83.51%. The SCOPES after a positive score has probability 84.25% for diversion. The SCOPES after a negative score has probability 87.72% for primary repair. The SCOPES will always give the accurate consistent result and has inherent advantages over human clinical decision making.

What is already known on this topic?

Previous studies in colonic injury patients has pros and cons associated with risk factors for diversion. So far there are no clinical predictive score for recommendation of treatment of choice in patients with colonic injury.

What is this study adds?

The SCOPE has inherent advantages over human

clinical decisions. It can accommodate many more factors to consider than the human brain and provide consistent results, especially in less experienced surgeons. In addition, it has more accuracy than clinical judgment alone.

Potential conflicts of interest

None.

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บทคัดย่อ **คะแนนทำนายวิธีการเกิดการบาดเจ็บของลำไส้ใหญ่โดยใช้ SCOPES**

ปริญญา สันติชาติงาม

แผนกศัลยกรรม โรงพยาบาลมหาราชนครราชสีมา จังหวัดนครราชสีมา

ภูมิหลัง: การบาดเจ็บของลำไส้ใหญ่พบได้บ่อยของอวัยวะบาดเจ็บในช่องท้อง การรักษามีการเปลี่ยนแปลงจากการผ่าตัดยก diversion มาสู่การ selected primary repair สามารถลดอัตราตายที่เกิดจากการบาดเจ็บของลำไส้ใหญ่ ปัจจุบันยังไม่มีคะแนนทำนายวิธีการรักษาการบาดเจ็บของลำไส้ใหญ่

วัตถุประสงค์: เพื่อพัฒนาคะแนนทำนายวิธีการรักษาการบาดเจ็บของลำไส้ใหญ่

วัสดุและวิธีการ: ศึกษาย้อนหลังในผู้ป่วยการบาดเจ็บของลำไส้ใหญ่ (ICD 10th: S365) ที่โรงพยาบาลมหาราชนครราชสีมา ช่วงเวลา 1 ตุลาคม 2551 ถึง 30 กันยายน 2557

ผลการรักษาและสรุป: คะแนนทำนายวิธีการรักษาการบาดเจ็บของลำไส้ใหญ่ (SCOPES: Santichatngam's Colonic Injury Prediction Score) ได้ค่าคะแนนของปัจจัยดังนี้: delayed time to surgery > 6 ชั่วโมง (+2.56), gross fecal contamination (+4.19), การบาดเจ็บข้างซ้าย (+2.32), duodenal/ureteral injury (+3.18) จุดตัดค่าคะแนนเท่ากับ 4.87 คือตั้งแต่ 2 ปัจจัย sensitivity 88.24%, specificity 83.51%, likelihood ratio for positive results 5.35 และ likelihood for negative results 0.14 ในระยะ validation ความน่าจะเป็นในการเลือกวิธี diversion เมื่อคะแนนมากกว่าจุดตัดเท่ากับ 84.25% และความน่าจะเป็นในการเลือกวิธี primary repair เมื่อคะแนนน้อยกว่าจุดตัดเท่ากับ 87.72%

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Original Article

Usefulness of Fournier Gangrene Severity Index in Managing the Patients at Viet Duc Hospital

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Abstract

Purpose: **Fournier's gangrene is a life-threatening necrotizing infection of the perineal, perianal, and periurethral tissues that can disseminate even at the subcutaneous tissue of the thigh. In this study, we identified prognostic factors for survival and validated the accuracy of the Fournier's gangrene severity index (FGSI) in patients with Fournier's gangrene.**

Materials and Methods: **We retrospectively reviewed medical records of patients diagnosed with Fournier's gangrene between 2009 and 2014. FGSI scores were assessed using a receiver operating characteristic curve. An outcome variable of inpatient mortality, univariate analyses were performed by SPSS 18.0.**

Results: **A total of 27 patients (92.6% male, mean age 50.3 ± 14 years) diagnosed with Fournier's gangrene met the criteria for review. The overall mortality rate was 14.8% (4 patients). FGSI ≥ 9 was 14.8% vs < 9 was 85.2%. Survival of the group with FGSI ≥ 9 was only 1/4 (25%) versus 22/23 (95.7%) in the group with FGSI < 9. The mean FGSI score for survivors was 3.57 ± 2.57 versus 10.5 ± 2.6 for nonsurvivors ($p < 0.001$). Using a FGSI score threshold of 9 (sensitivity 71.4%, specificity 90%) there was a 96% survival rate in patients with FGSI of less than 9 and a 46% mortality rate in those with FGSI of 9 or greater (RR = 17.25).**

Conclusions and Recommendations: **The FGSI remains an objective and simple method to quantify the extent of metabolic aberration at presentation in patients with Fournier's gangrene. FGSI threshold value of 9 is sensitive and specific for predicting mortality in this patient population and could be used for the clinical managements of FG.**

Keywords: **Fournier's Gangrene, Fournier Gangrene Severity Index, Necrotizing tissues**

Introduction

Fournier's Gangrene (FG) is a fulminant infection, including necrotising fasciitis of the genital, perineal and/or perianal regions. This condition is potentially fatal, affects any age and gender, has been reported even in neonates, is characterised by rapid progression of infection in soft tissue, caused by the synergistic action of several agencies that extend along fascial planes, causing necrosis of these tissues and destruction. The most frequent concomitant diseases

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are diabetes mellitus (DM) which presents up to 60% of cases, alcoholism and cancer, among other immunosuppressive diseases. Mortality has been reported in different series to range from 16 to 40%[1-5].

Its clinical presentation is variable, but often presents with oedema, erythema, pain, fever and increased volume. It is a situation that warrants urgent radical surgical treatment (debridement), in addition to the use of antibiotics. The management ranges from emergency surgery (debridement), managing topically (sodium hypochlorite, hydrogen superoxide and even honey), and administering antibiotics, to hyperbaric oxygen[3,6,7].

The Fournier Gangrene Severity Index (FGSI) introduced by Laor et al. in 1995 has been used successfully as a predict factor in managing the disease[8]. However, there was not so many publications on the issue conducted in Vietnam in the last years. Aim of this paper is to evaluate the value of FGSI that has been used in managing the FG patients treated in Viet Duc Hospital, one of the biggest centers of surgery in the Northern part of Vietnam.

Materials and Methodology

This retrospective and prospective study identified the patients with FG, admitted from August 2009 to August 2014. The data were collected from the Department of Septic Surgery of Viet Duc Hospital. FG diagnosis was established on clinical basis. Patient's age, gender, infection source, predisposing factors, clinical findings, various surgical procedures, and laboratory results were analysed.

FGSI was calculated by evaluating nine hospital admission parameters: temperature, respiratory rate, heart rate, sodium, potassium, creatinine, serum bicarbonate, leukocyte count and haemocrit. Evaluation criteria were gauged from 0 to +4 as described by Laor et al.[8].

We excluded patients with periurethral and scrotal abscesses if there was no evidence of extension to soft-tissue or necrosis. In this study, we divided all FG patients into two categories: survivor group (A) and nonsurvivor group (B). Univariate analyses (Student's *t*-test) were used for comparisons. A *p*-value of < 0.001 was considered statistically significant. The data was analysed by SPSS18.0.

Results

Twenty seven cases diagnosed with Fournier from 2009 to 2014 were analysed. The overall mean age was 50.3 ± 14 (range 19-80) years. Most of the patients (92.6%) were male. There were only two female cases, accounting for 7.4%.

Medical history

DM was commonly present in 33.3%, alcoholism in 14.8%, previous surgeries in 9.2% and trauma in 4.6%, respectively.

Sites of infections

The site of infection origin was perineal in 33.3% (9 cases); extended to scrotum in 25.9% (7 cases). The most common site of perineal infection was scrotum, accounted for 40.7% (11 cases).

Table 1 Fournier gangrene severity index

Index	Maximum value			Average			Minimun value		
Variable	4+	3+	2+	1+	0	1+	2+	3+	4+
Temperature (°C)	>41	39-40.9	-	38.5-38.9	36-38.4	34-35.9	32-33.9	30-31.9	<29.9
Pulse (rate /min)	>180	140-179	110-139	-	70-109	-	56-59	40-54	<39
Respiratory (b/min)	>50	35-49	-	25-34	12-24	10-11	6-9	-	<5
Serum Natri (mmol/L)	>180	160-179	155-159	150-154	130-149	-	120-129	110-119	<110
Serum Kali (mmol/L)	>7	6-6.9	-	5.5-5.9	3.5-5.4	3-3.4	2.5-2.9	-	<2.5
Serum Creatinin (mg/100ml)	>3.5	2-3.4	1.5-1.9	-	0.6-1.4	-	<0.6	-	-
Hematocrit %	>60	-	50-59.9	46-49	30-45.9	-	20-29.9	-	<20
WBC (Total/mm3 x 1000)	>40	-	20-39.9	15-19.9	3-14.9	-	1-2.9	-	<1
Serum Bicarbonate (mmol/L)	>52	41-51.9	-	32-40.9	22-31.9	-	18-21.9	15-17.9	<15

Symptoms

The most common symptoms at the time of admission in the hospital were fever (85%), increased scrotal volume (84%) and perineal or genital pain (71%). The average time of the symptoms prior to referral to the treatment was 6.4 days (range 2-15 days).

Management

The surgical procedure performed was debridement in all the patients. Overall, cystostomy was done in 28.8%. Twenty percent of the patients had colostomy and 8% of the patients had bilateral orchidectomy. As far as extensive debridement was concerned, 86.7% was done in the first 8 hours of admission to the hospitals, 65.2% of the patients underwent large debridement twice or thrice overall, repeated debridements in 86,7%.

Bacteriology aspects

The most frequent bacteria were *Escherichia coli* in 51.8%, followed by *Enterococcus faecalis* in 28%. Polymicrobial infection was found in 62.5%.

Table 2 FGSI

FGSI scores	N	%
FGSI ≥ 9	4	14.8
FGSI < 9	23	85.2
Total	**27**	**100**

Table 3 Relationship between outcomes and FGSI

FGSI scores	Survivors	Non-Survivors	N
FGSI ≥ 9	1	3	4
FGSI < 9	22	1	23
Total	**23**	**4**	**27**

The mean FGSI score for survivors was 3.57 ± 2.57 vs 10.5 ± 2.6 for non-survivors ($p < 0.001$).

Table 4 Complications

Complications	N	%
Bleeding from wounds	2	7.4
Pneumonia	4	14.8
Urinary infection	2	7.4
Severe sepsis *	1	3.7

*The patient died on admission

Overall outcomes: Twenty-three patients were discharged, accounting for 85.2% and four patients died, so the mortality was 14.8%.

Discussions

FG was first described as a rapidly progressing idiopathic infection, includes any necrotising infection of the external genitals and perineum in both men and women. The FG is a rare infection, the rate is from 0.4/100,000 habitants to 1.6/100,000 habitants or 0.02% of all admissions to urology wards. It is usually a polymicrobial infection whose probable physiopathology is due to endarteritis obliterans of the small and superficial veins, resulting in gangrene. Despite aggressive wide-spectrum antibiotic treatment, aggressive surgical debridement, intensive care and anaesthesia, the mortality rates are as high as 43% in most reports, but vary greatly and range from 4 to 88%[1,9,10].

In the most present series *E. coli* was the predominant bacterium[1,2,6,11]. Anaerobic and aerobic organisms that have been isolated from the most common wounds in our study are: *E. coli* (51.8%), and Enterococcus faecalis (28%). Polymicrobial infection was found in 62.5%. In study by Morua et al., 58% had polymicorbial infection, *E. coli* was the most frequent (48%)[1].

There is no consensus on clinical variables for predicting FG results. Lower limb and abdominal wall involvement are associated with high mortality rate and most studies have shown that aggressive therapy, age, comorbidities and time of presentation do not affect prognosis. Many prognostic factors such as advanced age, primary anorectal infections, DM, delayed treatment, synergistic sepsis on admission, anaemia, and high FGSI score have been reported in literature for FG. Other predisposing factors include local trauma, paraphimosis, periurethral extravasation of the urine, perirectal or anal infections, and surgeries such as circumcision or herniorrhaphy[9,12-15].

In our study, we found that higher mortality was seen in the patients older than 50 years. Overall mortality was 14.8%. This was consistent with other series. Although the majority of the patients presented in this series had DM (33.3 %), other predisposing factors including previous surgeries (9.2%), trauma (4.6%) and alcoholism (14.8 %) were also present.

There is still controversy as to whether the coexistence of DM influences prognosis. But in our study, which is consistent with the report by Korkut et al.[16], DM was significant in the mortality group.

We found the presence of sepsis on admission also to be a prognostic factor for FG and its mortality, as reported by Unalp et al.[17]. In our series, one patient had severe sepsis and died on admission.

Treatment for FG must be started as early as possible[2,11,18,19]. Early and aggressive debridement and use of wide-spectrum antibiotics are the gold standard for decreasing the mortality and morbidity. Debridement must be repeated with the same aggressive approach when necessary. In this study, it was observed that if the time interval between the first symptom and surgical intervention is increased, the mortality is increased, which is consistent with other studies.

We performed an extensive emergency debridement in all patients: 86.7% was done in the first 8 hours of admission to the hospitals; 65.2% underwent large debridement twice or thrice overall. Repeated debridements was performed in 86.7% of the FG patients in our study.

Some published series have emphasised that hyperbaric oxygen therapy can be helpful for the management of FG[5,9,12]. Limitations in the availability and transfer of the patients to units offering this service restrict its application for the patients with FG. Consequently, we did not utilise hyperbaric oxygen therapy for our patients due to lack of facilities.

FGSI, which was developed by Laor et al. is a good prognostic tool for assessing the FG patients[8]. Four cases (14.8%) had FGSI score ≥ 9, survivor was only one. In the group of FGSI < 9, there were 22 survivors. We also found that FGSI score system is a good tool for predicting severity of the disease and mortality risk of the patients. In the study by Yong Kim Ik et al., the mean FGSI was 9.25 in patients who had died and 4.69 in patients who survived[20]. Of the factors affecting to the mortality, sepsis and FGSI of 9 points or over at the time of hospitalization were statistically significant. Tsung Yen et al. has found the patients who had FGSI 5.5 ± 2.7 survived, However, the patients who died had FGSI score 10.2 ± 4.6[13]. Similar to the study by Silvio et al., the mortality rate was 84.6% in the group of patients with FGSI > 9 and 14.3% in the group of patients with FGSI < 9[10].

FG is an infectious process that can lead to death in up to 40% of patients. Early diagnosis and aggressive surgical interventions, and intensive postoperative care have undoubtedly controlled the mortality rates. Understanding the physiopathology and predisposing factors is essential for early diagnosis and treatment. There is currently no level I evidence for the use of indices for predicting mortality[21-23].

In conclusion, we have found that older age, DM, anaemia, sepsis, delay in initial treatment and FGSI core ≥ 9 are the important predicting severity factors. According to Tsung-Yen et al. the simplified FGSI is easily applied, and is able to recognize the patients with poor prognosis and should make the suitable management as well[13].

Conclusions

The FGSI remains an objective and simple method to quantify the extent of metabolic aberration at presentation in patients with FG. Despite the intensive care, the mortality is now still relatively high. Since Laor et al. has introduced the FGSI in treating the Fournier patients with good results, it has been widely accepted. It remains a simple method for assessing severity of presentation and predicting outcome in the complex patients with FG. The study conducted at Viet Duc Hospital supports previous findings that a FGSI threshold of 9 is a sensitive and specific predictor of mortality during initial assessment. We found the predictive factors of mortality such as the patients over 60 years old, alcoholism, associated diseases especially diabetes mellitus and cardiovascular problems, wide variety pathogens isolated and antibiotic resistance, severity of necrotizing as well as its management or FGSI ≥ 9. A multidisciplinary approach should always be considered for the efficient management of the clinical condition, which can help to reduce the mortality.

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Original Article

What are the Significant Prognostic Factors to Predict the Outcome of Conservative (Nondiversion) Treatment in Patents with Cervical Cancer with Radiation Cystitis?

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Abstract

Background: **Hematuria from radiotherapy to treat cervical cancer (CA CX) is a problem and a challenge in patient care for urologists. These patients have continued to suffer from pain, disease chronicity and other side effects of the radiotherapy. From past to present, the algorithm of treatment has focused on outcomes of numerous treatment modalities and described their characteristics, hemostatic mechanisms, advantages and disadvantages.**

Objective: **This study looks back to identify what patient-related factors were important and affected the success prognosis of the treatment, particularly of conservative (nondiversion) treatment.**

Materials and Methods: **It was a retrospective study, using data of patients in the Urology Unit of Lerdsin Hospital over15 years (October 2002 - September 2016). A total of 148 patients had complete data and were divided to 112 patients with conservative (nondiversion) treatment and 36 patients with diversion treatment. Eight patient factors were taken into the study as follows: bladder capacity, grade of telangiectasia, creatinine level, degree of hydronephrosis, urinary tract infection (UTI), severity of bleeding, age and medical illnesses(diabetes mellitus (DM) and/or hypertension (HT)).**

Results: **According to the statistical calculation in the study to compare each of the factors in both groups of the patients, namely with conservative (nondiversion) and diversion treatment, significant differences were found in all factors, except the age. In addition, multiple logistic regression analysis, which controlled the effects of other factors, found that factors that affected the treatment success (to stop bleeding) in patients with CA CX and radiation cystitis were bladder capacity, creatinine level and age. Patients with bladder capacities ≤ 150 ml were 18 times more likely to receive the diversion treatment when compared to those with the capacities > 150 ml. Patients with creatinine levels > 1.50 mg/dl were 61 times likely to receive the diversion treatment when compared to those with the levels ≤ 1.50. Patients aged > 55 years were 0.03 time more likely to receive the diversion treatment when compared to those aged ≤ 55 years.**

Conclusion: **These results may be applied by urologists to predict the success of conservative (nondiversion) treatment and help them make quicker decision in changing the treatment plan to the diversion treatment.**

Keywords: **Hematuria, radiation cystitis, nondiversion, diversion**

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Introduction

In the present day, cervical cancer (CA CX) is the second most common cancer in women. Guidelines and important steps in treatment of this disease in addition to surgery and chemotherapy lie in the radiation therapy.

Radiation-induced hemorrhagic cystitis usually occurs anywhere from 6 months to 10 years after the exposure but may also be delayed for up to 20 years[1]. It was found in 6.5% of pelvic radiation[2]. Treatment of this condition has always been a challenge to urologists because of the pain and suffering of patients from massive loss of blood, urinary tract infection (UTI) or severe septicemia, renal insufficiency, disease chronicity, long-term care, and the need for hospitalization or several admissions and discharges. These eventually result in stress and depression. The patients present with problems of hematuria,dysuria, frequent urination, urinary incontinence, fever, hypogastrium pain, lumbar pain, degenerative kidneys, and some have urinary retention because of clot in bladder, pallor because of blood loss, and considerable pelvic pain.

Mechanism of Radiation-Induced Hemorrhagic Cystitis

The radiation causes endocystitis, followed by telangiectasia, submucosal hemorrhage and interstitial fibrosis[3]. The capacity and flexibility of the bladder, therefore, are decreased. Thus, the patients have frequent urination, micturition painor urinary incontinence. In the end, the radiotherapy results in obliterative endarteritis, mucosal ischemia, ulceration and bleeding (Figure 1).

Another interesting explanation of the pathogenesis is that the radiation causes single- and double-stranded DNA breaks, which lead to activation of DNA damage repair genes and apoptosis. Additionally, DNA penetrates deeper muscles of the urinary bladder, causing endarteritis,compromised blood supply and inadequate supply of nutrients to bladder tissues.

Severity grades of the telangiectasia has been classified by the RadiationTherapy Oncology Group/ European Organization for Research and Treatment of Cancer (RTOG/EORTC). Late radiation morbidity scoring schema is classified as follows[5].

Grade1: Slight epithelial atrophy

Minor telangiectasia (microscopic hematuria)

Grade2: Generalized telangiectasia

Intermittent macroscopic hematuria

Grade3: Severe frequency and dysuria

Severe generalized telangiectasia (often with pethichiae)

Frequent hematuria

Reduction in bladder capacity < 150 cc

Grade4: Necrosis/contracted bladder (capacity (100 ml)

Severe hemorrhagic cystitis

The radiation cystitis is to be managed as per following accepted and gold standard algorithm for hemorrhagic cystitis management (Figure 2). Regarding each treatment modality, mechanisms of the related agents, medications or procedures have

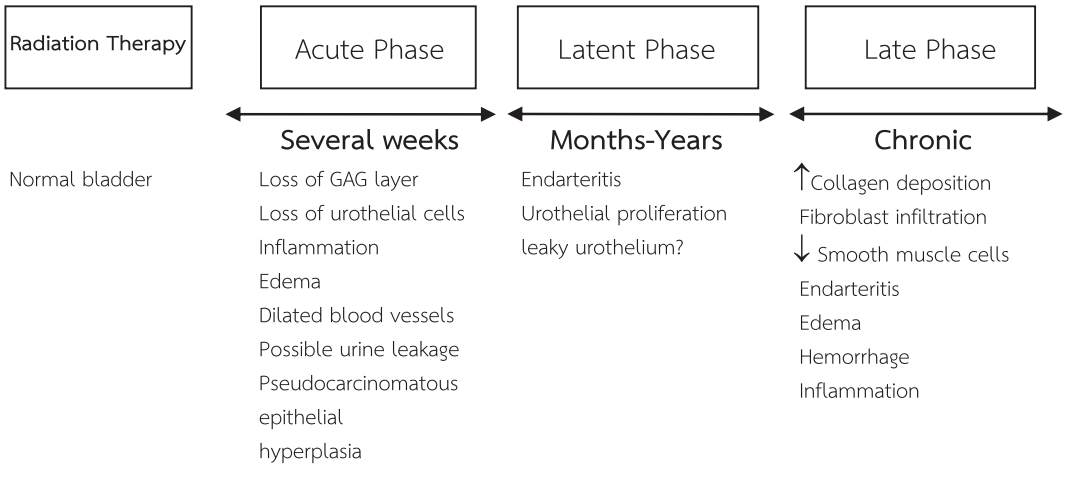

Figure 1 Development state of radiation cystitis[4]

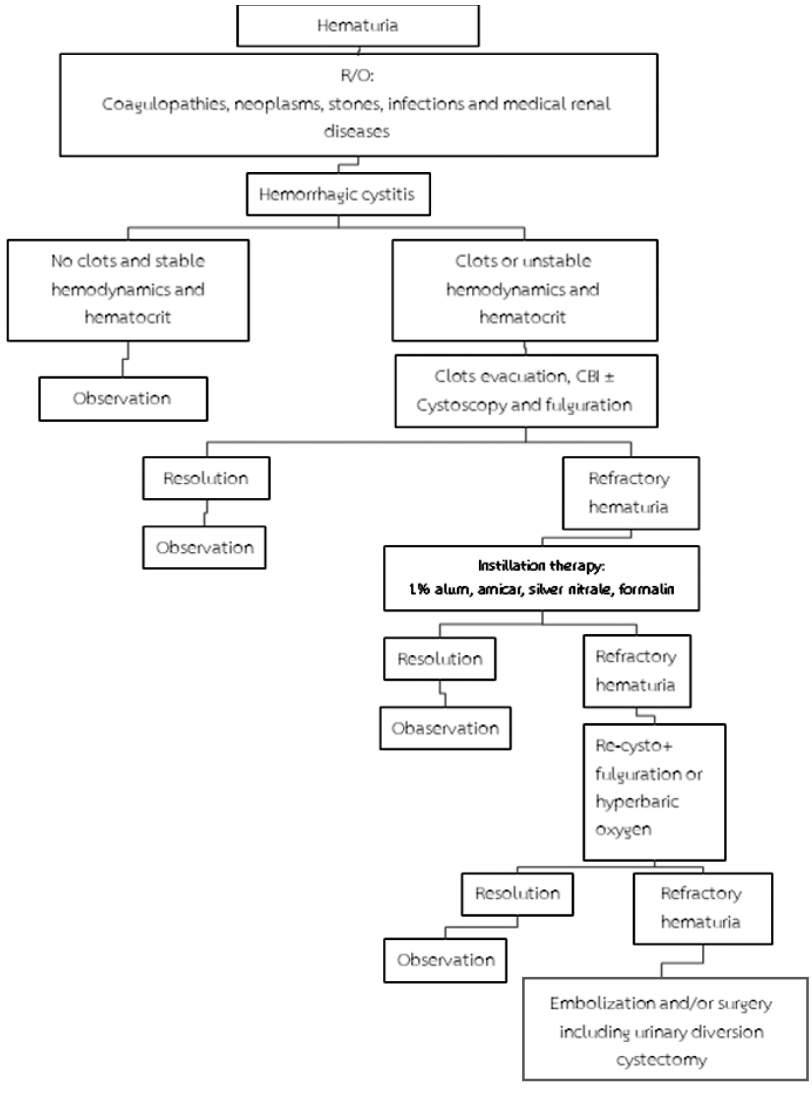

Figure 2 Algorithm for hematuria management[6]

been studied and described, with many conclusions on outcomes, advantages and disadvantages of each modality used[7-23]. On the other hand, based on literature review, the researcher did not find any study that determined patient factors affecting the success of each treatment modality, particularly of the conservative (nondiversion) treatment.

Management of Radiation Cystitis

The treatment providers need to make differential diagnosis for other diseases/conditions with hematuria, such as urinary tract calculi, UTI, inflammation and infection, coagulopathies, nonbladder (renal, ureter, urethra) bleeding and recurrent CA CX with bladder invasion.

Conservative (Nondiversion) Treatment

There are many treatment patterns and different mechanisms to stop the bleeding. The modalities basically include oral and intravenous (IV) medications, endoscopic instillation therapy, endoscopic treatment, using cystoscope with clot evacuation and fulguration, and laser coagulation. There are many medications or agents with several mechanisms used to stop the bleeding, including aminocaproic acid (inhibitor of plasminogen activator, which counteracts effects of urokinase) administered orally, parenterally, intravesically[24]; alum irrigation (astringent at the sites of bleeding, causing protein precipitation at the urothelial surface)[25]; intravesical instillation of silver nitrate solution (0.5 - 1%) for 10-20 min (chemical

coagulation and eschar formation at the bleeding sites)[26]; phenol instillation (100% phenol with 30 ml glycine for 1 min)[27]; and formaldehyde instillation (1-2% concentration for15 min) that cause precipitation of cellular proteins of the bladder mucosa and occluding and fixative action over the telangiectasia tissue and small capillaries[28,29]; IV WF10 (immu-nokine) that counteracts the inflammatory process[11]; and hyperbaric oxygen to make the bleeding subside because of neovascularization, enhanced angiogenesis and granulation tissue formation[19]. In addition, embolization of one or both internal iliac arteries is employed, using blood clot, gel foam or histoacryl[20].

Urinary Diversion Treatment

This treatment is used to decrease exposure of hemorrhagic areas to urokinase to allow hemostasis[21-23]. It includes percutaneous nephrostomy, bilateral cutaneous ureterostomy, ileal conduit, and cystectomy with urinary diversion.

Plenty of other treatment options for the radiation cystitis have also been reported. Examples include conjugated estrogen in oral and IV forms (stabilizing microvasculature)[30], sodium pentosanpolysulfate (uroprotective quality to decrease the inflammatory process)[31], intravesical instillation of prostaglandins (decreasing the inflammatory response and hemorrhage)[32], fibrin hemostatic agent[33], argon plasma coagulation[34], potassium titanyl phosphate (KTP) laser[35], medical antishock trousers and cryotherapy[36].

Materials and Methods

This was a retrospective descriptive study to determine patient factors affecting the success of the conservative (nondiversion) treatment of CA CX patients with the radiation cystitis. Following the hospital ethics approval, data were collected of such patients with the radiation-induced hemorrhagic cystitis at the Urology Unit of Lerdsin Hospital from October 2002 to September 2016, total 15 years. The data used were derived from medical records, IPD and OPD cards that contained complete data until the end of the treatment and allowed for follow-up. The data related to the research were divided into demographic data (such as age, height, weight, body mass index (BMI), underlying diseases, occupation, marital status, time following the radiotherapy for the CA CX until hematuria) and insights into the patients for statistical analyses, study results and answers to the questions of the research. These insights comprised the following eight patient factors:

1. Bladder capacity
2. Grade of telangiectasia
3. Creatinine level (renal function)
4. Degree of hydronephrosis
5. UTI
6. Severity of bleeding
7. Age
8. Medical illnesses(DM, HT)

All patients whose data were studied had to be sorted for other diseases or conditions with hematuria (bladder or non-bladder caused), such as bleeding from inflammation and infection, urinary calculi or tumors, recurrent CA CX with bladder invasion, medical bleeding or coagulopathies.

Medical checkups were performed by checking vital signs; blood chemistry for renal functions (blood urea nitrogen (BUN), creatinine) and other diseases of the patients, such as complete blood count (CBC), electrolytes, liver function test(LFT), fasting blood sugar (FBS), cholesterol (HDL, LDL), triglyceride (TG), uric acid, prothrombin time (PT), partial thromboplastin time (PTT) and bleeding time; chest x-ray(CXR), and electrocardiography(EKG).

Every patient underwent cystoscopy to assess pathological condition of the bladder, to measure the bladder capacity and to record the grade of telangiectasia. The severity of the bleeding was also assessed. Urine exam C/S was conducted in order to assess infection and to determine appropriate antibiotics. Imaging study was conducted to determine the pathological condition of the urinary(KUB) system and degree of hydronephrosis. The differential diagnosis for other diseases/conditions with hematuria was made withthe KUB ultrasonography (U/S), or computed tomography (CT) of the KUB or whole abdomen.

The conservative (nondiversion) treatment used in the patient care in this study (following the cystoscopy) consisted of observation, retained catheter with continuous bladder irrigation (CBI), cystoscopy and clot evacuation, cystoscopy and fulguration, intravesical instillation with 2% formalin, IV WF10, hyperbaric oxygen and embolization of internal iliac artery while the diversion treatment used comprised percutaneous

nephrostomy (PCN), bilateral cutaneous ureterostomy, ileal conduit and cystectomy and diversion.

The patient care procedures were according to the algorithm for radiation cystitis management presented under introduction. The success to stop bleeding at any stage of the conservative (nondiversion) treatment was determined when the patients were free from the gross hematuria for a minimum of six consecutive months (disease free for sixmonths) based on track records of patient care).

Inclusion Criteria

Medical records, and IPD and OPD cards with complete details of the patient demographic data, of the research-related factors as well as of treatment steps, duration, outcomes and follow-up.

Exclusion Criteria

Patients with rebleeding at more than six months after final stage of the nondiversion treatment were not taken as new population (were considered being in successful group). If there was a treatment complication of bladder perforation, the patients had to receive the diversion treatment and were not considered being in unsuccessful group.

Statistical Analyses

Comparison of each of the factors between the patients in the conservative (nondiversion) and diversion treatment groups was made using Chi-square / Fisher's exact test. Factors that affected the success to stop bleeding were determined using multiple logistic regression.

Results

Table 1 contains the demographic data in number and percentage of each factor, the number and percentage of individual diversion and nondiversion treatment.

Table 2 shows a statistical comparison between the groups of patients receiving nondiversion and diversion treatment of the eight factors. The differences between the two groups were found to be significant in all factors, except the age (Chi-square / Fisher's exact test).

Table 3 demonstrates statistical analyses using the multiple logistic regression by controlling impacts

Table 1 The number and percentages of the demographic data of the patients (n = 148)

Variable	Number of patients (%)	Mean ± SD (minimum: maximum)
Age (years)		55.5 ± 4.6 (47:69)
≤ 55	83 (56)	
> 55	65 (44)	
Body weight (kg)		46.9 ± 1.9 (43:52)
Height (m)		1.58 ± 0.25 (1.5:1.67)
Hospital stay (days)		26.9 ± 11.97 (8:52)
BMI (kg/m^2)		18.67 ± 0.78 (17.18:21.64)
After radiation (years)		7.54 ± 3.04 (2:16)
Bladder capacity (ml)		172 ± 6.1 (75:245)
> 150	104 (70.3)	
≤ 150	44 (29.7)	
Grade of telangiectasia		
1	18 (12.2)	
2	83 (56.1)	
3	40 (27.0)	
4	7 (4.7)	
Creatinine level (mg/dl)		1.64 ± 0.45 (1.12:3.6)
≤ 1.5	97 (65.5)	
> 1.5	51 (34.5)	
Hydronephrosis		
No	91 (61.5)	
Mild, moderate, severe	57 (38.5)	
UTI		
Controlled	136 (92)	
Uncontrolled	12 (8.1)	
Severity of bleeding		
Continued/rebleeding	125 (84.5)	
Active bleeding	23 (15.5)	
Medical illness DM, HT		
No	89 (60)	
DM and/or HT	59 (40)	
Procedure of treatment		
Observation	41 (27.7)	
Retained catheter with bladder irrigation	21 (14.2)	
Cystoscopy and clot evacuation	20 (13.5)	
Cystoscopy and fulguration	23 (15.5)	
Intravesical instillation with 2% formalin	5 (3.4)	
IV WF-10	2 (1.4)	
PCN	12 (8.1)	
Bilateral cutaneous ureterostomy	22 (14.9)	
Ileal conduit	2 (1.4)	
Treatment		
Urinary diversion	36 (24.3)	
Nondiversion	112 (75.7)	

Table 2 Comparison between the patients receiving the nondiversion and urinary diversion treatment

Variable	Number of patients (%)		
	Nondiversion	Urinary diversion	*p*-value
Bladder capacity (ml)			< 0.001
> 150	101 (92)	3 (8.3)	
≤ 150	11 (9.8)	33 (91.7)	
Grade of telangiectasia			< 0.001
1, 2	101 (90.2)	0	
3, 4	11 (9.8)	36 (100.0)	
Creatinine level (mg/dl)			< 0.001
≤ 1.5	96 (85.7)	1 (2.8)	
> 1.5	16 (14.3)	35 (97.2)	
Hydronephrosis			< 0.001
No	91 (81.3)	0	
Mild, moderate, severe	21 (18.8)	36 (100.0)	
UTI			0.009*
Controlled	107 (95.5)	29 (80.6)	
Uncontrolled	5 (4.5)	7 (19.4)	
Severity of bleeding			0.004
Continued/rebleeding	100 (89.3)	25 (69.4)	
Active bleeding	12 (10.7)	11 (30.6)	
Age (years)			0.485
≤ 55	61 (54.5)	22 (61.1)	
> 55	51 (45.5)	14 (38.9)	
Medical illnesses (DM, HT)			< 0.001
No	78 (69.6)	11 (30.6)	
DM and/or HT	34 (30.4)	25 (69.4)	

*Fisher's exact test

Table 3 Factors Affecting the Diversion in the Patients

Variable	Urinary diversion Number of patients with successful treatment (%)	OR_{crude}	$OR_{adjusted}$	95% CI	*p*-value
Bladder capacity (ml)					0.003
> 150	3 (8.3)	1	1		
≤ 150	33 (91.7)	101	17.6	2.7-117.8	
Creatinine level (mg/dl)					0.003
≤ 1.5	1 (2.8)	1	1		
> 1.5	35 (97.2)	210	60.8	4.2-883.4	
Age (years)					0.009
≤ 55	22 (61.1)	1	1		
> 55	14 (38.9)	0.8	0.03	0.0-0.4	
Medical illnesses (DM, HT)					0.074
No	11 (30.6)	1	1		
DM and/or HT	25 (69.4)	5.2	10.7	0.8-144.0	

of other factors. The factors that affected the treatment success (to stop bleeding) were bladder capacity, creatinine level and age. The patients with bladder capacities (150 ml were 18 times more likely to receive the diversion treatment as compared to those with bladder capacities > 150 ml (adjusted odds ratio (OR) = 17.6, 95% confidential interval (CI): 2.7-117.8). The patients with creatinine levels >1.5 mg/dl were 61 times more likely to receive the diversion treatment as compared to those with creatinine levels (1.5 mg/dl (adjusted OR=60.8, 95% CI: 4.2-883.4), and the patients over the age of 55 years were 0.03 time more likely to receive such treatment as compared to those (55 years of age (adjusted OR = 0.03, 95% CI: 0.002-0.433).

Discussion

CA CX still is one of the most common cancers in females. Regarding the current treatment in addition to surgery and chemotherapy, radiotherapy is still the main treatment. Side effects of the radiotherapy are dependent on amounts of the radiation used and areas of the radiation exposure[37]. There has been research to find ways to prevent or minimize side effects of the radiotherapy all along, but the radiation cystitis is still substantially found.

The algorithm of treatment involves standard practice guidelines and the hemostatic mechanism of each modality, and has been extensively studied. Most articles focus on effects of each treatment modality. This particular study, therefore, has tried to look back to find patient factors to be used in the success prognosis for the conservative (nondiversion) treatment for this condition so that urologists may use as a guide for assessment of patients during treatment, and these factors may help to change the treatment plan from nondiversion to diversion treatment faster by the urologists relying on information derived from the assessment of various factors that are important to the success in treatment, as displayed by the study results. This seems to be good in overall for clinicians, medical personnel and patients in terms of the disease prognosis, minimization of the prolonged hospitalization of patients, and time, cost and personnel saving. In addition, physical conditions of patients will resume faster with no need to suffer from the pain, blood loss, infection or the disease chronicity anymore.

The decision for the diversion treatment, however, would need to be accompanied by information and explanation of advantages and disadvantages to make patients understand and accept it because the patients will need to have the opening hole for drainage of urine at the waist or abdomen throughout the life in exchange for keeping the blood stopped.

Conclusions

The multiple logistic regression analysis in this study has found that factors that affect the success of the treatment of radiation cystitis in patients with CA CX seem to be bladder capacity, creatinine level and age. Patients with bladder capacities (150 ml were 18 times more likely to receive the diversion treatment as compared to those with the capacities >150 ml. Patients with creatinine levels > 1.5 mg/dl were 61 times more likely to receive the diversion treatment as compared to those with the levels (1.5, and patients aged > 55 years were 0.03 time more likely to receive such treatment as compared to those aged ≤ 55 years.

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บทคัดย่อ **ปัจจัยใดที่มีผลต่อความสำเร็จในการรักษาผู้ป่วยมะเร็งปากมดลูกที่มีปัสสาวะเป็นเลือดจากการฉายแสงโดยวิธี Conservative (Nondiversion) Treatment**

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หน่วยศัลยศาสตร์ระบบทางเดินปัสสาวะ กลุ่มงานศัลยศาสตร์ โรงพยาบาลเลิดสิน กรมการแพทย์

ที่มาและความสำคัญ: ภาวะปัสสาวะเป็นเลือดจากการฉายแสงเพื่อรักษามะเร็งปากมดลูกยังเป็นปัญหาและท้าทายในการดูแลรักษาผู้ป่วยต่อศัลยแพทย์ระบบทางเดินปัสสาวะ ผู้ป่วยเหล่านี้ยังคงต้องทุกข์ทรมานต่อความเจ็บปวด ความเรื้อรังของโรคและผลข้างเคียงอื่น ๆ จากการฉายแสงในอดีตจนถึงปัจจุบัน แนวทางการรักษามีการศึกษาถึงผลของการรักษาในวิธีต่าง ๆ มาอย่างมากมายอธิบายถึงคุณสมบัติกลไกการทำให้เลือดหยุดข้อดีข้อเสียในแต่ละวิธีนั้น ๆ มาโดยตลอด

วัตถุประสงค์: ในการศึกษานี้เป็นเหมือนการมองย้อนกลับเพื่อศึกษาว่ามีปัจจัยใดบ้างในตัวผู้ป่วยที่มีความสำคัญและมีผลต่อการพยากรณ์ถึงผลสำเร็จของการรักษา โดยเฉพาะการรักษาแบบ conservative (nondiversion) treatment

วัสดุและวิธีการ: เป็นการศึกษาแบบ retrospective study ใช้ข้อมูลของผู้ป่วยในหน่วยศัลยกรรมระบบทางเดินปัสสาวะ โรงพยาบาลเลิดสิน (ต.ค. 2545 - ก.ย. 2559) รวม 15 ปี มีคนไข้ที่มีข้อมูลครบถ้วนเพื่อการศึกษาทั้งสิ้น 148 คน แบ่งเป็นการรักษาด้วยวิธี conservative (nondiversion) treatment 112 ราย diversion treatment 36 ราย

ปัจจัยของผู้ป่วยที่นำมาศึกษามี 8 ประการ ดังนี้

Bladder capacity, grade of telangiectasia, creatinine level, degree of hydronephrosis, UTI, severity of bleeding, age, medical illness (DM and/or HT)

ผลการศึกษา: จากผลการศึกษาโดยการคำนวณทางสถิติเพื่อเปรียบเทียบความแตกต่างของแต่ละปัจจัยในผู้ป่วยทั้ง 2 กลุ่ม conservative (nondiversion) และ diversion treatment พบว่ามีความแตกต่างอย่างมีนัยสำคัญทุกปัจจัย ยกเว้น age และจากการวิเคราะห์โดยใช้ multiple logistic regression โดยควบคุมผลกระทบของปัจจัยอื่น ๆ พบว่าปัจจัยที่มีผลต่อความสำเร็จในการรักษา (stop bleeding) ในผู้ป่วย CA cervix with radiation cystitis ได้แก่ bladder capacity, creatinine level และ age คือผู้ป่วยที่มี bladder capacity $\leq$ 150 cc มีโอกาสต้องทำการรักษาแบบ diversion treatment เป็น 18 เท่า เทียบกับผู้ป่วยที่มี bladder capacity > 150 cc

ผู้ป่วยที่มี creatinine level > 1.50 มีโอกาสต้องทำการรักษาแบบ diversion treatment เป็น 61 เท่าของผู้ป่วยที่มี creatinine level $\leq$ 1.50

ผู้ป่วยที่มีอายุ > 55 ปี มีโอกาสต้องทำการรักษาแบบ diversion treatment เป็น 0.03 เท่าของผู้ป่วยที่มีอายุ $\leq$ 55 ปี

สรุป: ผลของการศึกษาทำให้ศัลยแพทย์ระบบทางเดินปัสสาวะสามารถนำมาใช้เพื่อเป็นการพยากรณ์ถึงผลสำเร็จของการรักษาแบบ conservative (nondiversion) treatment และช่วยในการตัดสินใจได้รวดเร็วขึ้นในการเปลี่ยนแผนการรักษาไปเป็นแบบ diversion treatment โดยอาศัยข้อมูลอ้างอิงจากงานวิจัยนี้

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Case Report

Endoscopic Esophageal Polypectomy of a Giant Fibrovascular Polyp: Case Report and Literature Review

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Abstract ***Background:*** **Giant fibrovascular polyps of the esophagus are rare tumors. They are usually located in the upper third of the esophagus. Symptoms include dysphagia and regurgitation of the mass into the oral cavity, which can cause airway obstruction, secondary to mechanical pressure on the larynx.**

We present a 34-year-old male patient with a 10-month history of gradually intermittent dysphagia and regurgitating mass into the mouth without syncope, airway obstruction, weight loss, melena and hematemesis. After diagnosis of a giant fibrovascular polyp of the esophagus, endoscopic polypectomy was performed. Histopathological examination revealed a fibrovascular polyp. Esophagoscopy at 2 years after excision showed no mass or symptom recurrence. The literatures regarding giant esophageal polyp were reviewed.

Keywords: **Dysphagia, esophageal polyp, endoscopic polypectomy, fibrovascular polyp**

Introduction

Giant pedunculated esophageal polyps are very rare benign neoplasm. Moersch and Harrington discovered that 44 (0.59%) benign esophageal tumors were identified in 7,459 consecutive autopsies at the Mayo Clinic[1]. Amongst benign esophageal tumors, only 0.03% were giant fibrovascular polyps[2]. They are more frequent in males (male:female ratio = 3:1)[3]. Average age at diagnosis was 54 years with a range of 19 months to 88 years.

Location

About 85% of polyps are located in the upper third of the esophagus, close to the upper esophageal sphincter, and originate as small mucosal or submucosaltumors, extending into the esophageal lumen due to peristalsis which then become pedunculated polyps. The peristaltic activity from the esophagus through constant traction, over the years, leads to the growth of this lesion[4,5].

Clinical manifestation

Sixty-two percent of the patients were presented with dysphagia which was the most frequently symptom. The dysphagia was usually progressive, starting with solids and then advancing to liquids. The second most

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common symptom was regurgitation of the mass into the mouth, which occurred in 38% of the patients. Other symptoms were a lump in the throat, weight loss, regurgitated of food, chest pain, coughing, odynophagia, sore throat, vomiting, abdominal pain, melena and asphyxiation, which results from impaction of the polyp in the glottis. This is the most dreadful complication[4-6].

Diagnostic evaluation

Barium studies are commonly used[5,6]. However, they have a low sensitivity to demonstrate the pedicle lesion[7]. Endoscopy is helpful in visualization of polypoid mass originated at upper esophagus, but it was found that 22% of initial barium studies along with 33% of initial endoscopic examinations failed to identify the presence of polyps[4]. An endoscopic ultrasound may be useful as an adjunct imaging examination since it provides information about the size and origin of the lesion on the vascularization of the polyps[8]. CT scanning and an MRI are more accurate in evaluating these lesions, which may be useful both for diagnosis as well as for surgical planning[9].

Histologic examination of resected polyps

Histologic examinations revealed a variety of cell types. 34% are fibrovascular, 21% are fibroma, 17% are lipomas, 11% are fibrolipomas whilst others are hamartoma, schwannoma, giant cell tumor, epithelioma[4]. Fibrovascular polyps are covered with normal mucosa and containing amounts of fibrous, vascular and adipose tissue therefore, these polypoid lesions have been termed as lipomas, fibromas, fibrolipomas, or fibroepithelial polyps in the literature. The World Health Organization has classified them as fibrovascular polyps. Malignant transformation is rare, but has been reported in esophageal polyps as the lipomatous components can undergo sarcomatous changes. The squamous mucosa can develop into squamous cell carcinoma, while small polyps can develop into adenocarcinoma[10-12].

Treatment

Giant fibrovascular polyps should be removed surgically as soon as possible after confirmation of diagnosis depending on the risk of airway obstruction. Current treatment for this complication includes resection through cervical incision, thoracotomy or endoscopic approach. If the stalk can be visualized endoscopically, endoscopic resection can be performed[13-17]. Use of a detachable snare loop, or stapling device allows good vascular control for achievement of hemostasis which is the most important key of treatment due to hypervascularity at stalk.

In one case, ablation of the polyp was achieved by endoscopic YAG laser vaporization[18]. However, in many other cases, surgical excision is required because of poor visualization, site of attachment of the stalk, or impending airway obstruction[18]. Nonoperative management of these lesions is of historical interest only and should be avoided.

A Case Report

A 34-year-old Thai male patient presented with a 10-month history of gradually intermittent dysphagia and regurgitated mass into the mouth without weight loss, melena nor hematemesis. He had no other medical conditions. The physical examination revealed a 5x2 cm mass in the mouth provoked by coughing with its disappearance on swallowing. No other abnormality was detected during the physical examination.

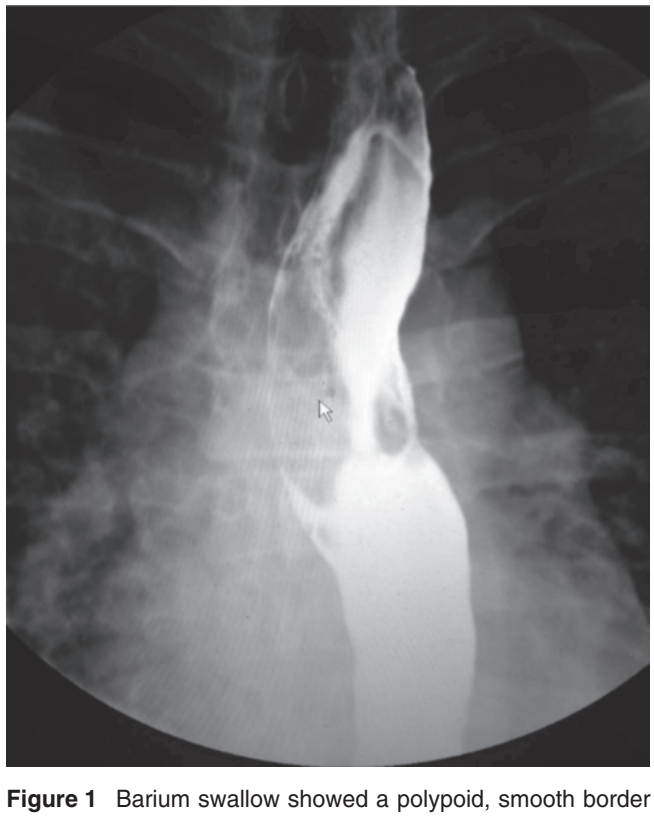

Figure 1 Barium swallow showed a polypoid, smooth border with a filling defect originating from the cervical esophagus.

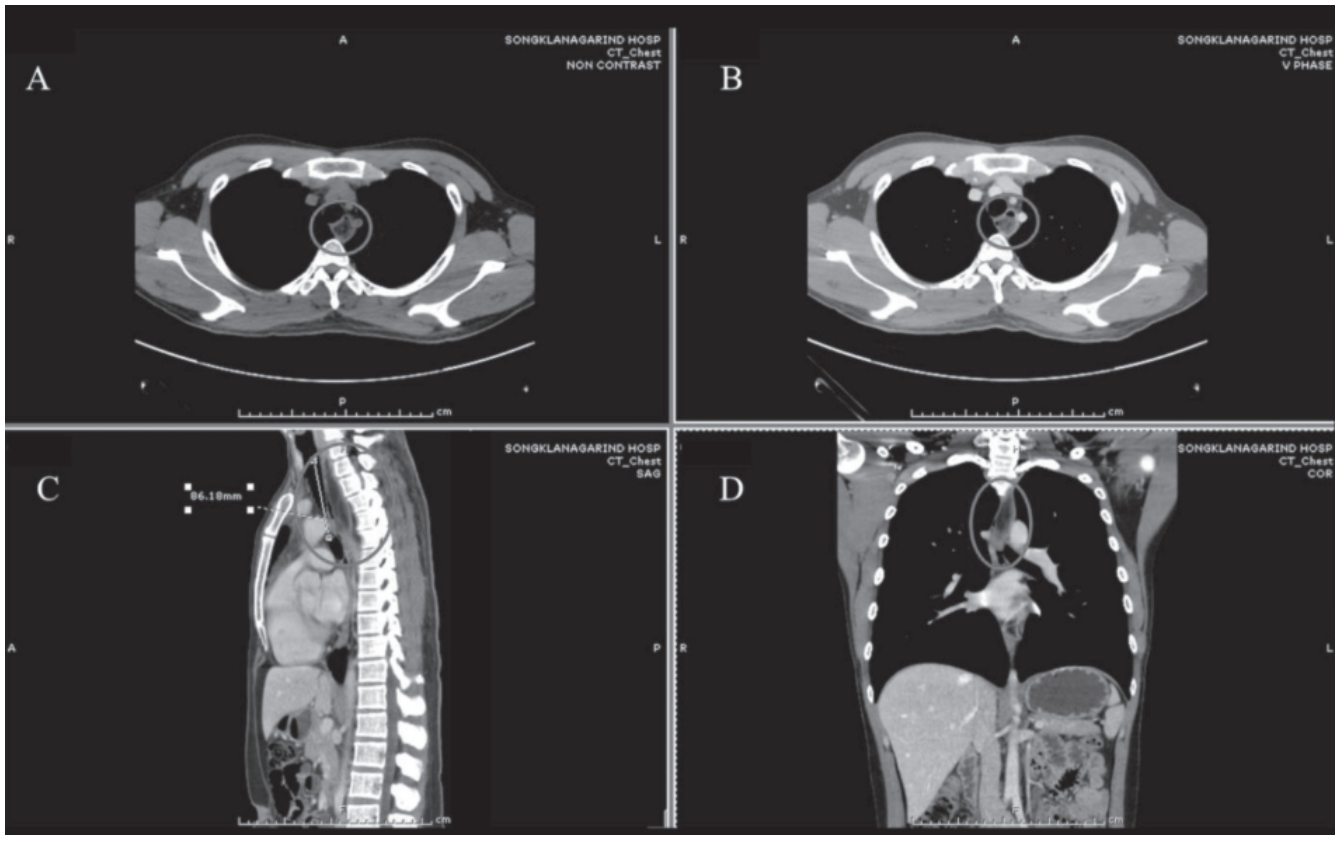

Figure 2 Chest CT scan demonstrated well-defined, tubular shaped lesion at the proximal esophageal lumen.

Radiologic examination with barium swallow showed a polypoid, smooth border, filling defect originating from the cervical esophagus, about C7 level, caused moderate luminal narrowing without obstruction (Figure 1). The thoracic computerized tomographic scan demonstrated a well-defined tubular fatty lesion within the proximal esophageal lumen, measuring about 1.6 cm in diameter and 8.6 cm in length (Figure 2).

The flexible esophagoscopy showed a pedunculated smooth surface mass, 8 cm in length, arising from the upper esophageal sphincter and extending down into middle esophagus. No specific abnormality was detected in the stomach and proximal duodenum (Figure 3).

The diagnosis of fibrovascular polyp was made from radio-graphically examination, and confirmed by endoscopic biopsy. Laboratory investigations and a chest radiograph were within normal limits. An endoscopic esophageal polypectomy was selected.

The patient was taken to the operating room for a planned polypectomy under general anesthesia.

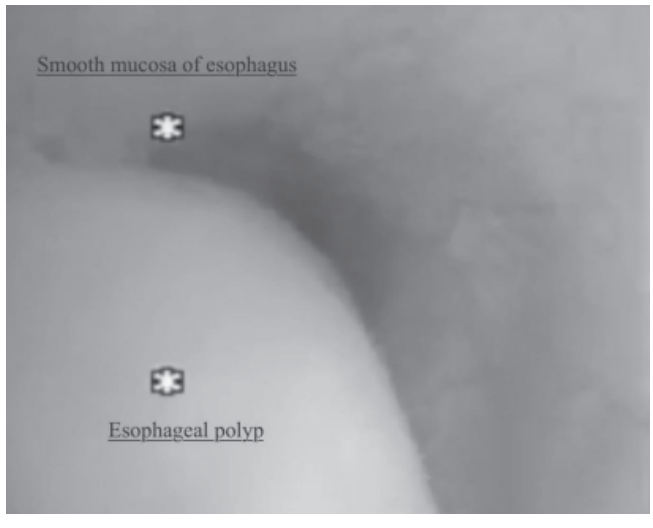

Figure 3 Flexible esophagoscopy showed pedunculated mass arising from the upper esophageal sphincter.

Flexible esophagoscope was performed first, which revealed a polyp as previous described. The distal end of the polyp was then extracted by grasping the polyp and retracted through the oral cavity (Figure 4).

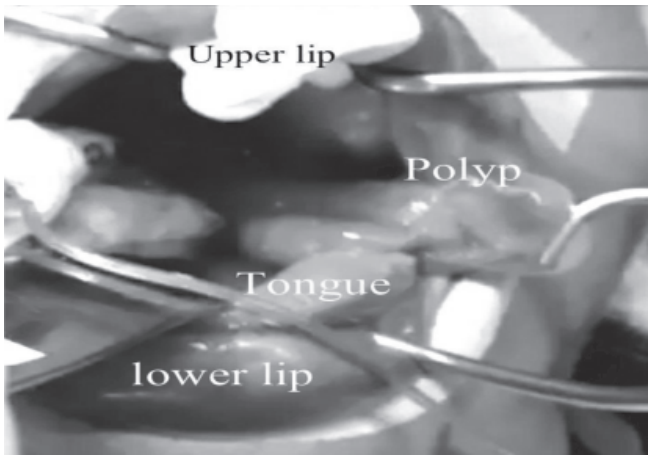

Figure 4 Distal portion of polyp extracted from mouth while still attached to the cervical esophagus

Endoscopic mechanical hemostasis was achieved with the tightening of a rubber stopper to tamponade any feeder vessels in the polyp stalk by a detachable snare loop (Endoloop, Olympus, Tokyo, Japan) (Figure 5A, 5B). Placement of a diathermy snare above endoloop following hot snare polypectomy (ICC 200, Erbe, Tubingen, Germany) (Figure 5C, 5D). The esophageal lumen was then inspected, and was found to be free from bleeding, mucosal tears, or perforation. The polyp was approximately 7 cm in size (Figure 6).

Liquid diet was begun postoperatively on the day of surgery. On the next day, the patient was advanced to regular diet. The patient recovered uneventfully and was cured of his dysphagia.

Histopathological examination demonstrated a benign appearing fibrovascular proliferation, and the overlying epithelium showed no evidence of morphologic atypia, mitotic figures, nor features of malignancy. The lesion was consistent with a fibrovascular polyp.

The patient was followed up for more than two years with esophagoscopy, which revealed no

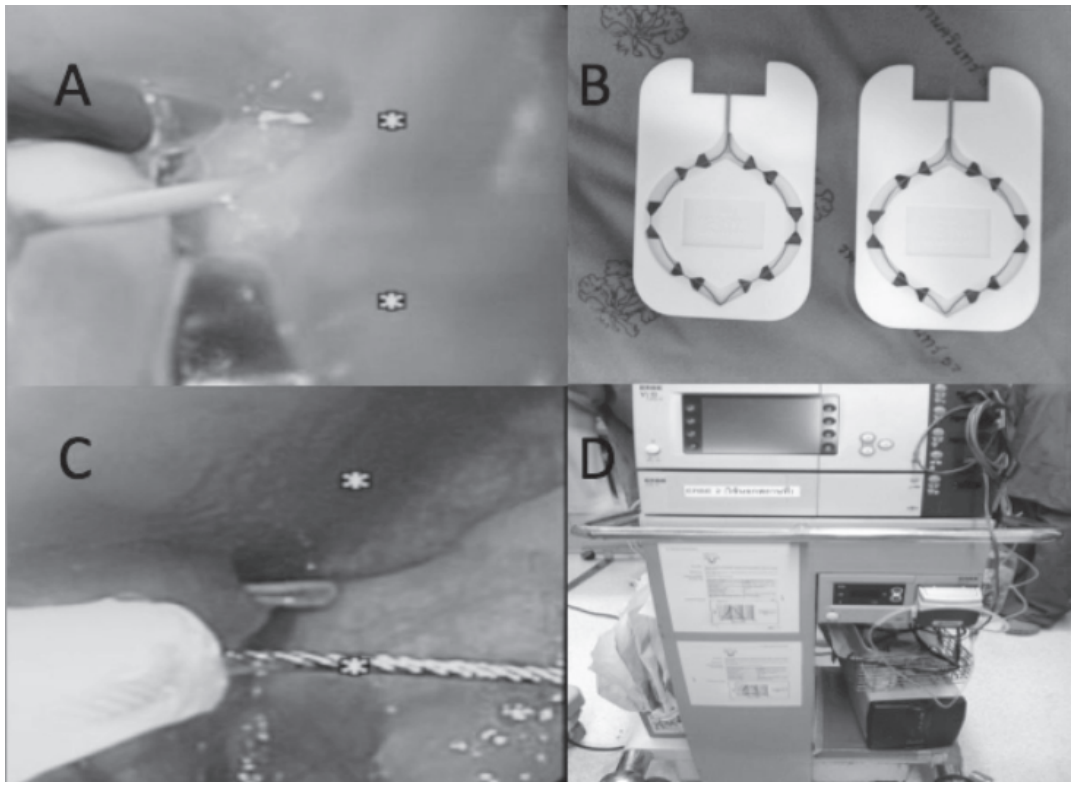

Figure 5 A.Placement of Endoloop around polyp stalk then tightening of rubber stopper to tamponade any feeder vessels in the polyp stalk B. Endoloop (Olympus, Tokyo, Japan) C. Placement of diathermy snare above endoloop following by a hot snare polypectomy D. Diathermy snare (ICC 200, Erbe, Tubingen, Germany)

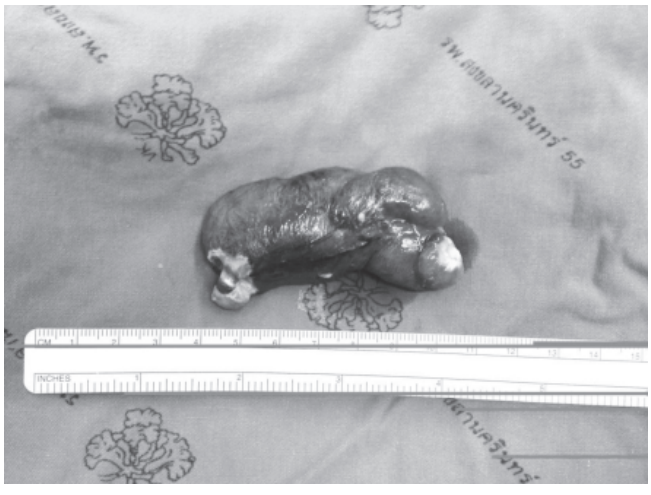

Figure 6 Gross surgical specimen of the fibrovascular polyp.

recurrence.

Discussion

Giant fibrovascular polyp is a rare entity with few cases reported in the literature. It is a benign intraluminal tumor of esophagus consisting of fibrous and lipomatous components with hypervascularity. The redundant submucosal folds with the peristaltic activity from the esophagus leading to the growth of this lesion, which is attached to the esophageal wall by a small pedicle. The polyps are usually located in the upper third of the esophagus. Malignant changes had been reported by Bak et al.[10], Marcial et al.[11] and Petry et al.[12]. Dysphagia and regurgitated mass into the oral cavity had also been seen in this patient without asphyxia. Negative contrast and endoscopic studies should be accepted with caution and repeated if necessary. CT scanning and MRI are more accurate in evaluation of these lesions, which in turn may be useful both for diagnosis and surgical planning[6].

The definitive treatment of fibrovascular polyp is excision, which can be performed either endoscopically or surgically such as Pallabazzer et al.[15] and Badi et al.[19] reported surgical removal by esophagotomy approach. Successful endoscopic esophageal polypectomy have been reported by Jie et al.[17], Lee et al.[20] and Lobo et al.[21] Recent reports on esophageal polyps and their removal are shown in Table 1.

In our case, it was possible to remove the entire polyp endoscopically without complication using a detachable snare loop following a hot snare polypectomy despite being large in size.

Table 1 Recent reports of esophageal polyps and their removal

Report	Year	Size(cm)	Location of polyp	Detection method	Surgical approach	Ref
Garcia B et al.	2012	16 × 7 × 7	Below Killian's area	CT chest, endoscopy	Esophagotomy	13
Madeira FP et al.	2013	23 × 9 × 9	Upper esophageal sphincter	Chagas serology, CT chest, EGD, esophageal manometry	Esophagectomy	14
Pallabazzer G et al.	2013	18 × 5.4 × 4	Hypopharynx	EGD, CT chest, EUS	Cervicotomy and pharyngotomy	15
Park JS et al.	2014	> 5	Cervical esophagus	EGD	Endoscopic polypectomy	22
Badi R et al.	2015	12 × 4 × 3	Cervical esophagus	Barium swallow, EGD, EUS, CT chest	Left cervical exploration	19
Diane L et al.	2016	15 × 5	Cervical esophagus	CT chest, EUS	Endoscopic piecemeal resection	16
Jie L et al.	2016	18 × 6	Cervical esophagus	Barium swallow, EGD, EUS, CT chest	Endoscopic polypectomy	17
Lee JW et al.	2016	12.5 × 3.2	Cervical esophagus	EGD, EUS	Endoscopic polypectomy	20
Lobo N et al.	2016	7	upper esophagus	CT chest, Barium swallow	Endoscopic resection using ultrasonic shears	21

CT = Computer Tomography ,EGD = Esophagogas troduodenoscopy, EUS = Endoscopic ultrasound

Conclusion

Giant fibrovascular polyps of the esophagus are rare tumors. The polyps should be removed as soon as possible depending on the risk of airway obstruction. Appropriate treatment depends on the accurate assessment of the origin, diameter, and vascularity of the pedicle, along with tumor size. Endoscopic procedure has already been accepted as a minimally invasive alternative to surgery, and provides faster patient recovery and early return to work or normal routines.

Disclosure

No authors report any conflict of interest.

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บทคัดย่อ **รายงานผู้ป่วยที่ได้รับการรักษาติ่งเนื้อขนาดใหญ่ที่หลอดอาหารโดยวิธีส่องกล้อง**

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ภูมิหลัง: ติ่งเนื้อขนาดใหญ่ที่บริเวณหลอดอาหารเป็นเนื้องอกที่พบได้น้อยมาก โดยมากจะพบในบริเวณหลอดอาหารส่วนบน แสดงอาการกลืนลำบากและอาการทางเดินหายใจอุดตันจากการสำรอกก้อนเนื้องอกขึ้นมาในช่องปากจนกดกล่องเสียง

การนำเสนอรายงานผู้ป่วย: ผู้ป่วยชายอายุ 34 ปี มีอาการกลืนลำบากและสำรอกก้อนเนื้องอกเข้ามาในช่องปากเป็นครั้งคราว โดยที่ไม่มีอาการเป็นลม ทางเดินหายใจอุดตัน น้ำหนักลด ถ่ายดำ หรืออาเจียนเป็นเลือด หลังจากได้รับการวินิจฉัย ผู้ป่วยได้รับการรักษาโดยการตัดก้อนเนื้องอกผ่านการส่องกล้อง ติดตามหลังจากผ่าตัด 2 ปีพบว่าไม่มีก้อนและอาการกลับเป็นซ้ำ

สรุป: ติ่งเนื้อขนาดใหญ่บริเวณหลอดอาหารพบได้น้อย โดยที่ผู้ป่วยจะมีความเสี่ยงต่อทางเดินหายใจอุดตัน การรักษาที่เหมาะสมจะต้องคำนึงถึงตำแหน่ง ขนาด และเส้นเลือดที่ขั้วของติ่งเนื้อ การรักษาผ่านการส่องกล้องจะทำให้ผู้ป่วยฟื้นตัวและกลับไปใช้ชีวิตตามปกติได้รวดเร็ว