Atherosclerosis Obliterans of the Lower Extremities in Thai Patients

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Background: *Major limbs loss and high mortality rate were observed in the management of Thai patients with atherosclerosis obliterans (ASO) of the lower extremities. These were the results of delayed diagnosis and treatment together with the associated morbidities. There is a lack of information of this disease resulting in a lack of knowledge and awareness of this problem among general practitioners in Thailand.*

Objectives: *The purposes of this study were (1) to identify the prevalence of this disease in a tertiary care hospital, (2) to enumerate the risk factors and comorbidities, (3) to identify clinical characteristics of the disease and (4) to evaluate the outcomes of treatment.*

Material and Method: *A prospective study of patients with ASO of the lower extremities was carried out between January 2000 and December 2004. Patients having clinical manifestations of chronic and acute arterial occlusion with the absence of ankle pulse were included in the present study. Evidence of atheromatous plaque by angiography, operative finding, and histopathology of arterial wall from amputated specimens were used to confirm the diagnosis. The selection of surgical treatments for this disease such as revascularization, major amputation, minor amputation and debridement depended on the severity of limb ischaemia, the status of distal artery and the patients' general condition. The risk factors, comorbidities, clinical manifestations, site of arterial occlusion, severity of ischaemia, types of surgical treatment and outcomes of management were analyzed.*

Results: *Four hundred and fourteen consecutive patients with ASO were diagnosed in the present study with a prevalence of 1.02:1,000. Femoro-popliteal arterial segment was the most common site (221 cases, 53.4%) of the affected arteries. Diabetes mellitus (253 cases, 61. 1%) was the most common risk factor of ASO followed by hypertension (217 cases, 52.4%), smoking (195 cases, 47.1%) and hyperlipidemia (172 cases, 41.5%). Ischaemic heart disease (108 cases, 26.1%) was the most common comorbidity of ASO followed by major stroke (56 cases, 13.5%) and chronic renal failure (20 cases, 4.8%). Patients with ASO presented mostly as chronic manifestations (385 cases, 93%) or with limb-threatening condition (326 cases, 78.7%). The clinical manifestations were ischaemic ulcer and/or digital gangrene (251cases, 60.6%), rest pain (182 cases, 44.0%) incapacitating claudication (62 cases, 15.0%) and acute ischaemic pain (29 cases, 7.0%). One hundred and thirty eight (33.3%) patients had significant lower limb infection at the time of admission. One hundred and seventy one (41.3%) patients underwent revascularization procedures as the major primary treatments to salvage the limbs. The success rate of limb salvage after revascularization was 76.6% (131/171). Major amputation after revascularization was 16.9%(29/171). Perioperative mortality rate of revascularization procedure was 8.2%(14/171). Major amputation was required as the primary treatment due to infective (18.4%, 76/414) and ischaemic process (6.5%, 27/414). The mortality rate of primary major amputation for infection and ischaemia were 19.7%(15/76) and 25.9%(7/27) respectively. The total mortality rate in the present study was 11.3% (47/414). The common causes of death were sepsis and ischaemic heart disease.*

Conclusion: *ASO of the lower extremities is one of the major problems for national health care causing major limb loss and death. Arterial bypass surgery was the most effective treatment for limb salvage. Management of this disease at the terminal stage causes high morbidity and mortality. Hence, early detection of this disease and correction of the risk factors should be the most effective strategy to improve the overall outcome of the management of this complicated problem.*

Keywords: *Atherosclerosis obliterans, Peripheral arterial disease, Lower extremities*

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Atherosclerosis obliterans (ASO) of the lower extremities, the most common peripheral arterial disease (PAD)[1], used to be regarded as an uncommon disease in the Thai population due to their low fat diet and a tropical climate living. This perception caused delayed diagnosis and treatment of this disease. Major limb loss was inevitable due to the extensive ischaemia at the time of referral to the tertiary care medical center. Moreover, there was a lack of publications on the epidemiological study of ASO in Thai patients resulting in the lack of knowledge and awareness of this disease among general practitioners. The purposes of the present study were(1) to identify the prevalence of this disease in a tertiary care hospital, (2) to enumerate the risk factors and comorbidities, (3) to identify clinical characteristics of the disease and (4) to evaluate the outcomes of treatment.

Material and Method

Between January 2000 and December 2004, the patients having clinical manifestations of non-healed ulcers, digital gangrene, rest pain and acute ischaemic pain together with the absence of ankle pulse of dorsalis pedis and posterior tibial arteries were admitted into a specialized vascular surgery unit for the intensive management. Diagnosis of ASO was based on clinical presentations, images of segmental irregular narrowing of atheromatous plaque by angiography, the evidence of atheromatous plaque at the arterial wall during the operation and the histopathology of atherosclerosis in the arterial wall from amputated specimens. All patients with these criteria were included in the present study. Other arterial occlusive diseases such as embolism and arteritis were excluded from the present study.

The patients in the present study underwent complete clinical evaluation of limb ischaemia, doppler ultrasonography for segmental arterial pressure measurement together with velocity waveform evaluation, and laboratory study for the assessment of general status, comorbidities and risk factors. The severity of limb ischaemia was classified into two categories: limb-threatening condition and non limb-threatening condition. Limb-threatening condition in the present study included both critical limb ischaemia in patients with chronic arterial occlusion (Fontaine's stage III and IV) and acute limb ischaemia in patients with acute arterial occlusion[2]. The patients with fit condition but under limb-threatening condition (rest pain, acute ischaemic

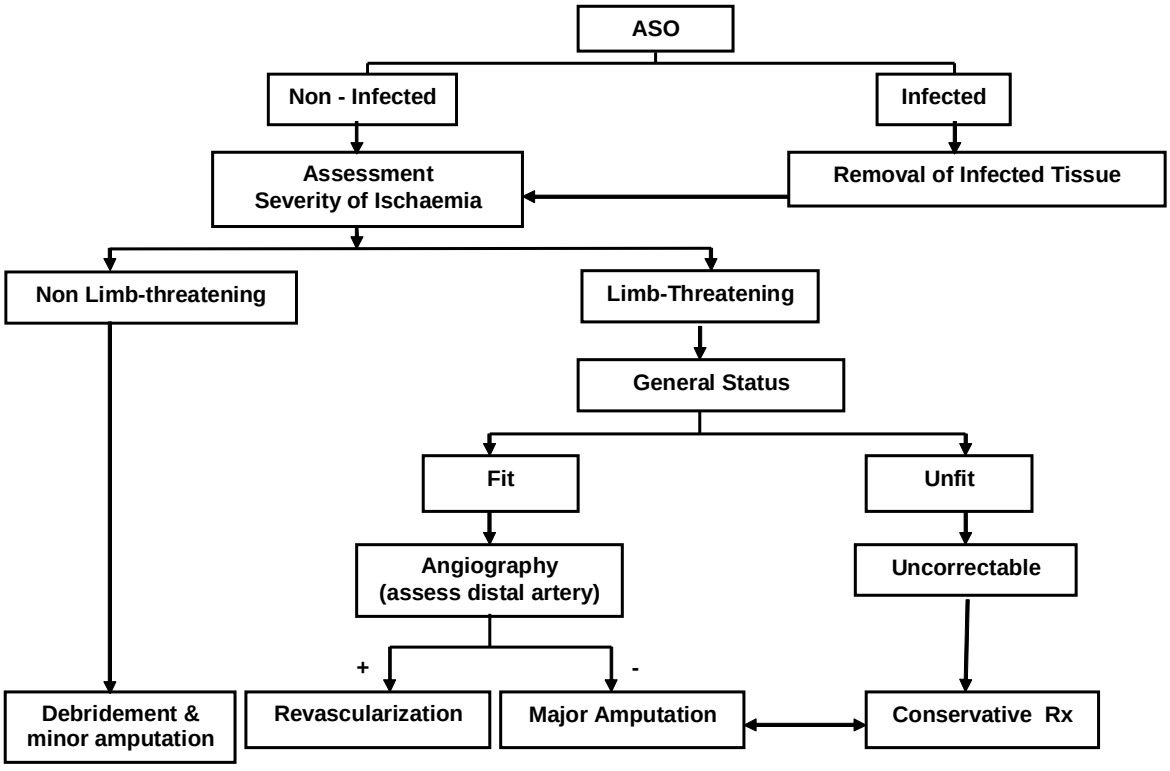

Fig. 1 An outline of the management of patients with atherosclerosis obliterans of the lower extremities

pain, non-healed ulcer, digital gangrene, ankle brachial pressure index < 0.4 and monophasic velocity waveform[3,4]) were sent for contrast angiography in order to confirm the diagnosis of ASO and assess the possibility of revascularization by identifying the patency of distal artery run off[5]. Revascularization procedures were carried out in patients who had good patency of distal arteries. Additional procedures such as debridement and minor amputation were required for the treatment of residual necrotic tissue or gangrenous toe. Intensive postoperative monitoring after revascularization was necessary to maintain the optimal hemodynamic status. Meticulous local care of ischaemic ulcer was also applied to complete the healing process. In patients under non limb-threatening condition, the ischaemic ulcer and digital gangrene were simply treated by debridement and minor amputation.

Patients with significant infections in the lower extremities at the time of admission were required to have the surgical procedures for adequate removal of infected tissue prior to the process of vascular reconstruction.

Major amputations were indicated in patients who had poor distal artery run off, ischaemic or infective lesions which extended beyond forefoot level and failure of arterial bypass surgery[6].

The outline of management of patients with ASO was demonstrated in Fig. 1. The outcomes of management were assessed by the success rate of limb salvageability (complete healing of ulcer, no limb pain, no major amputation and no perioperative mortality), the major amputation rate and the mortality rate.

All information included demographic information, risk factors, comorbidities, extent of disease, types of clinical presentation, severity of ischaemia, types of surgical treatment and outcomes of management were recorded and analyzed. Frequency distribution tables with number and percent were presented to describe all information.

Results

Of the consecutive 537 patients with symptoms of peripheral arterial occlusive disease and the absence of peripheral ankle pulse, 414 (77.1%) patients had atherosclerosis obliterans while of the remainder 107 (19.9%) had arterial embolism, 11 (2.1%) arteritis and 5 (0.9%) thromboangiitis obliterans. The prevalence of ASO in the present study was 1.02:1,000. Gender and age distribution, sites of arterial occlusion and contralateral limb status are summarized in Table 1. Of these 414 patients, there were 251 (60.6%) male and 163 (39.4%) female with a mean age of 66.9 $\pm$ 12.4 years. There was no significant difference in the mean age between the two genders. The frequency of ASO in those affected arteries was as follows: femoro-popliteal segment (221 cases, 53.4%), tibioperoneal segment (90 cases, 21.7%), iliofemoral segment (56 cases, 13.5%) and aortoiliac segment (47 cases, 11.4%). 243 (58.7%) patients had abnormal peripheral pulse on the contralateral limb. 16 (3.9%) patients had also had previous major amputation on the contralateral limb prior to the admission.

Risk factors, comorbidities, and clinical characteristics are summarized in Table 2. Diabetes mellitus (253 cases, 61.1%) was the most common risk factor of ASO in the present series, followed by hypertension (217 cases, 52.4%), cigarette smoking (195 cases, 47.1%) and hyperlipidemia (172 cases, 41.5%). Ischaemic heart disease (108 cases, 26.1%) was the most common comorbidity of ASO in the present series followed by major stroke (56 cases, 13.5%) and chronic renal failure (20 cases, 4.8%).

Table 1. Demographic information, sites of arterial occlusion and contralateral limb status of 414 patients with athero-sclerosis obliterans of the lower extremities

Characteristics	Frequency No (%)
Gender	
Male	251 (60.6)
Female	163 (39.4)
Age (year)	
Total	
Mean (SD)	66.9 (12.4)
Median	69
Range	41-98
Male / Female	
Mean (SD)	65.6 (12.4)/69.1 (12.1)
Median	68/70
Range	42-93/41-98
Sites of arterial occlusion	
Aortoiliac	47 (11.4)
Iliofemoral	56 (13.5)
Femoropopliteal	221 (53.4)
Tibioperoneal	90 (21.7)
Contralateral limb status and sites of arterial occlusion	
Aorto-iliac	47 (11.4)
Iliofemoral	16 (3.9)
Femoropopliteal	90 (21.7)
Tibioperoneal	90 (21.7)
Major amputation	16 (3.9)
Normal	155 (37.4)

Table 2. Risk factors, comorbidities and clinical characteristics of 414 patients with atherosclerosis obliterans on of the lower extremities

Characteristics	Frequency No (%)
Risk factors	
Diabetes mellitus	253 (61.1)
Hypertension	217 (52.4)
Smoking	195 (47.1)
Hyperlipidaemia	172 (41.5)
Comorbidities	
Ischaemic heart	108 (26.1)
Stroke	56 (13.5)
Renal failure	20 (4.8)
Types of presentation	
Chronic	385 (93.0)
Acute	29 (7.0)
Severity of ischaemia	
Limb-threatening	326 (78.7)
Non limb-threatening	88 (21.3)
Infection at time of admission	
Yes	138 (33.3)
No	276 (66.7)

Types of clinical manifestations were 385 (93%) chronic and 29 (7%) acute presentation. There were 251 (60.6%) patients presenting with ischaemic ulcer and/or digital gangrene, 182 (44.0%) patients with rest pain, 62 (15.0%) patients with incapacitating intermittent claudication and 29 (7.0%) patients with acute ischaemic pain. 326 (78.7%) patients were under a limb-threatening condition. 138 (33.3%) patients had significant lower limb infection at the time of admission. Among these patients, 76 (18.4%) underwent major amputations, 52 (12.6%) minor amputations and 10 (2.4%) debridements. 14 patients who underwent minor amputation or debridement for infection also suffered from limb threatening ischaemia. These patients underwent the revascularization procedure to obtain the limb salvage (Fig. 2).

Table 3 depicts the information on the surgical treatments in the present study. Revascularization procedure was the major primary treatment for limb salvage in 171 (41.3%) patients. Table 4 detailed the sites and types of revascularization. Of these 171 procedures, there were 124 (72.5%) proximal arterial bypasses, 46 (26.9%) distal arterial bypasses, and 1 (0.6%) thromboendarterectomy at the level of arterial occlusion. Major amputations due to ischaemic process were done in 56 (13.5%) patients: 29 (7.0%) after revascularization and 27 (6.5%) without revascularization. Minor amputation and debridement were also carried out in 39 (9.4%) and 9 (2.2%) patients respectively in order to remove the residual necrotic tissue and complete the healing process after revascularization. Of 40 (13.8%) patients

Table 3. Surgical treatment of 414 patients with atherosclerosis obliterans on of the lower extremities

Types of treatment	Frequency No (%)
Revascularization	171 (41.3)
Proximal ABS	124 (30.0)
Distal ABS	46 (11.1)
Endarterectomy	1 (0.2)
Major amputation	132 (31.9)
Infection	76 (18.4)
Ischaemia	56 (13.5)
Minor amputation	117 (28.3)
Infection	52 (12.6)
Ischaemia	65 (15.7)
Debridement	33 (8.0)
Infection	10 (2.4)
Ischaemia	23 (5.6)

Table 4. Sites and types of 171 revascularization procedures

Types of revascularization	Frequency No (%)
Aortic bypass	17 (9.9)
Aorto-iliac	1 (0.6)
Aorto-femoral	15 (8.7)
Aorto-popliteal	1 (0.6)
Iliac bypass	10 (5.9)
Ilio-femoral	8 (4.7)
Ilio-popliteal	2 (1.2)
Femoral bypass	76 (44.4)
Femoral-popliteal	55 (32.1)
Femoral-anterior tibial	10 (5.8)
Femoral-posterior tibial	8 (4.7)
Femoral-peroneal	1 (0.6)
Femoral-dorsalis pedis	2 (1.2)
Popliteal bypass	25 (14.6)
Popliteal-anterior tibial	6 (3.5)
Popliteal-posterior tibial	10 (5.9)
Popliteal-peroneal	5 (2.9)
Popliteal-dorsalis pedis	4 (2.3)
Extra anatomic bypass	42 (24.6)
Axillo-femoral	32 (18.7)
Axillo-popliteal	3 (1.8)
Femoro-femoral	7 (4.1)
Endarterectomy	1 (0.6)

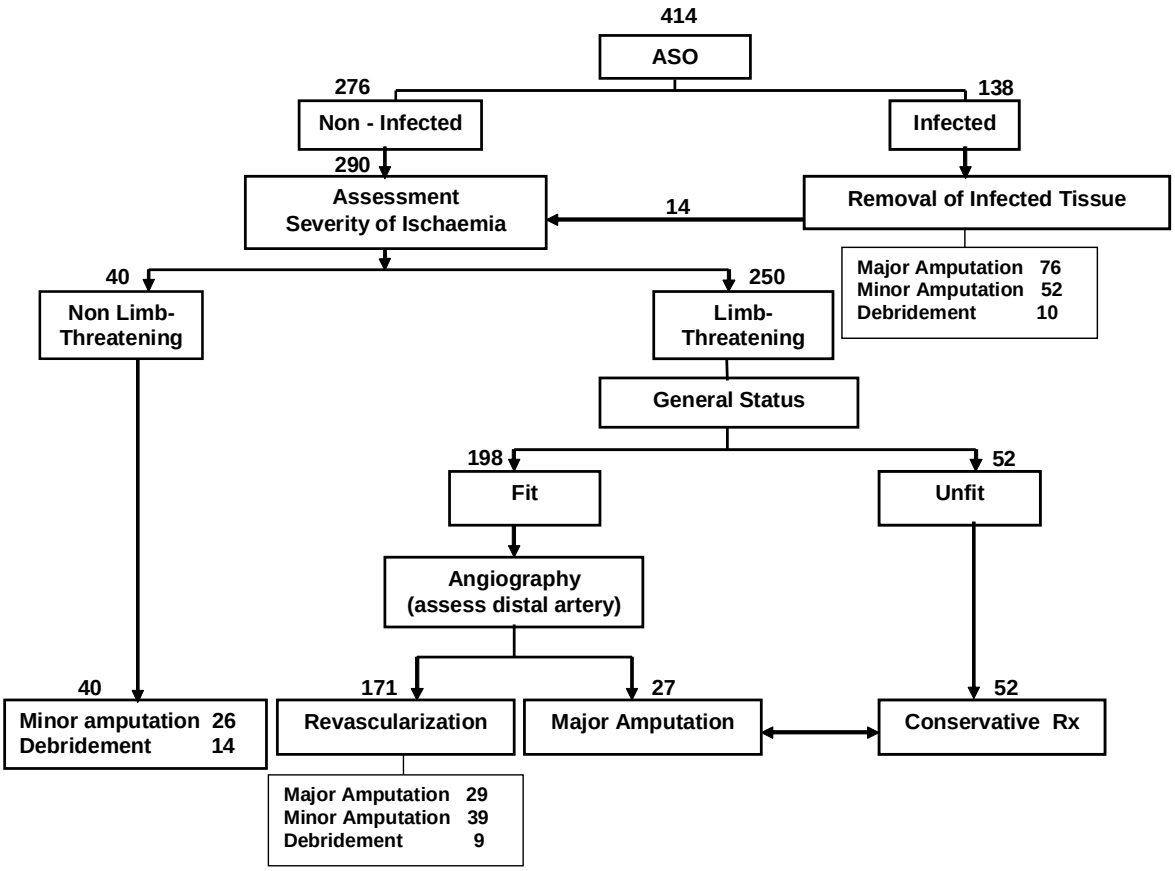

Fig. 2 A summary of the surgical treatment of 414 patients with atherosclerosis obliterans of the lower extremities

having ischaemic ulcer and digital gangrene under non limb-threatening condition, 26 (6.3%) were treated by minor amputation and 14 (3.4%) by debridement (Fig. 2).

The outcomes of management are summarized in Table 5. In the absence of infection, the revascularization could be done in 86.4% (171/198) of the patients having limb-threatening condition and good general status for major surgery. The success rate of limb salvage was 76.6% (131/171). The rate of major amputation and mortality post revascularization were 16.9% (29/171) and 8.2% (14/171) respectively. Primary major amputation without revascularization was done in 31.6% (103/326) of patients with limb-threatening condition 23.3% (76/326) due to infection and 8.3% (27/326) due to ischa-emia). The mortality rate of primary major amputation for infection and ischaemia were 19.7% (15/76) and 25.9% (7/27) respectively. The total mortality rate of primary major amputation was 21.4% (22/103). The total mortality rate in the present series was 11.3% (47/414). The most common causes of death were sepsis and ischaemic heart disease (Table 6).

Discussion

Atherosclerosis obliterans of the lower extremities was not an uncommon disease in Thai patients with the prevalence of 1.02:1,000 in this study. In addition, the severity of the disease in the present series was mostly categorized as limb-threatening conditions requiring intensive vascular management (Table 2). As expected, the number of unrecognized patients with this disease in any stage should be much more in community hospitals and general population. This disease commonly occurred in elderly patients with multiple risk factors and comorbidities (Table 1, 2). Taking care of patients with ASO requires the intensive assessment of these problems in order to obtain successful management

Diabetes mellitus was the most common risk factor (61.1%) of ASO in this study. Diabetes mellitus

was the potent risk factor of ASO. The risk of developing ASO in the lower extremities was proportional to the severity and duration of diabetes mellitus[7,8]. Diabetes mellitus also increased the risk of developing critical limb ischaemia and major amputation[9,10]. Detection of ASO in diabetic patients should be encouraged in general medical practice in order to identify this disease at the early stage. Cigarette smoking, another potent risk factor of ASO[11], was most commonly found in patients with the absence of diabetes mellitus in the present study (98/161, 60.9%). Large epidemiological studies have found that smoking increased the risk of ASO in the lower extremities by 2 to 6 fold[12,13]. This increased risk was correlated with the number of cigarettes smoked per day and the years of smoking[14,15]. Hypertension and hyperlipidemia were also the significant risk factors of ASO in Thai patients (Table 2). Cessation of smoking together with optimum control of hypertension and the level of serum lipid, should be included in the guidelines for national health care.

Femoro-popliteal arterial segment was the most common site (53.4%) of arterial occlusion in the present study. This was probably due to the greater susceptibility to atheromatous plaque formation from mechanical trauma caused by the closely associated adductor magnus tendon[16]. There were 243 (58.7%) patients with abnormal peripheral pulse on the contralateral limbs and 16 (3.9%) patients with previous major amputation on the contralateral side (Table 1). These indicated that the awareness of the on-going ischaemic process of the contralateral limb was also necessary to provide the surgical treatment for this problem at the optimal stage. Due to the gradually progressive clinical course as chronic presentation (93%), this disease was not recognized in its early stage. Subsequently, patients with ASO were mostly treated in the terminal stage such as a limb-threatening condition (78.7%) (Table 2). Infection was also another common problem (33.3%) in the present study requiring major amputation as the primary treatment (18.4%) (Table 2, 3). Limb salvageability could be improved if this disease were treated in the early stages with effective control of any infection.

Revascularization was the most effective treatment for limb salvage in patients with severe ASO. However, the feasibility of this procedure was in only 86.4% of patients with a limb-threatening condition and good general status for major surgery in the absence of infection. Furthermore, the success rate of this procedure was 76.6% with the high major amputation rate (16.9%) and mortality rate (8.2%). The total mortality rate of ASO in the present study was 11.3% (Table 5). These results were less favorable compared with the series from western countries[17-19]. This information indicated that the disease was undertaken at the terminal stage with high associated comorbidities[20,21]. The better result could be accomplished by a campaign of

Table 5. Outcomes of the surgical management of 414 patients with artheroclerosis obliterans of the lower extremities

Outcomes	Frequency No (%)
Revascularization rate	171/326 (52.4)*
	171/250 (68.4)**
	171/198 (86.4)***
Successful limb salvage	131/171 (76.6)
Major amputation (post revascularization)	29/171 (16.9)
Major amputation (no revascularization)	103/326 (31.6)*
- infection	76/326 (23.3)
- ischaemia	27/326 (8.3)
Mortality rate	
Revascularization	14/171 (8.2)
Primary major amputation	22/103 (21.4)
- infection	15/76 (19.7)
- ischaemia	7/27 (25.9)
Total mortality	47/414 (11.3)

* All patients with limb threatening condition

** Patients with limb threatening conditions without infection

*** Patients with limb threatening conditions and good general status for surgery without infections

Table 6. Causes of death of 171 patients after revascularization and 414 patients with ASO

Causes of death	Post-revascularization No (%)	Total No (%)
Sepsis	6/171 (3.5)	27/414 (6.5)
Ischaemic heart	7/171 (4.1)	18/414 (4.3)
Poor general status	1/171 (0.6)	2/414 (0.5)

detection of this disease at the early stage and the coordination among the specialists, including vascular surgeons, cardiologists and anesthetists, to set up the effective guidelines for such complex management[22]. The advance of new technology in vascular investigations such as computerized tomographic angiography (CTA)[23,24] and magnetic resonance angiography (MRA)[25] to delineate the whole arterial system of the lower extremities will increase the feasibility and success rate of revascularization. Finally, the overall results of management could be improved by organizing a prevention program with the correction of risk factors of ASO at the early stage[26].This strategy should be the national campaign in general medical practice.

In conclusion, ASO of the lower extremities is also one of the major problems of national health care causing major limb loss and early death. Arterial bypass surgery was the most effective treatment of this problem for limb salvage requiring the coordination of multiple specialties. Management of this disease at the terminal stage causes high morbidity and mortality. Early detection of this disease and correction of risk factors should be the most effective strategy to improve the overall outcome of the management of this complicated problem.

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โรคหลอดเลือดแดงของขาอุดตันจากแผ่นไขมันในคนไทย

ประมุข มุทิรางกูร, เฉนียน เรืองเศรษฐกิจ, ชุมพล ว่องวานิช, ณัฐวุฒิ เสริมสาธนสวัสดิ์, คามิน ชินศักดิ์ชัย

วัตถุประสงค์: *1. ศึกษาปริมาณความชุกของโรคนี้ในผู้ป่วยที่รับไว้รักษาภายในโรงพยาบาลศิริราช 2. ศึกษาปัจจัยเสี่ยงที่สำคัญและโรคร่วมที่พบในผู้ป่วยที่เป็นโรคนี้ 3. ศึกษาลักษณะทางคลินิกของผู้ป่วยโรคนี้ 4. ศึกษาผลการรักษาของผู้ป่วยโรคนี้*

วัสดุและวิธีการ: *การศึกษาได้ดำเนินการระหว่างวันที่ 1 มกราคม พ.ศ.2543 ถึง วันที่ 31 ธันวาคม พ.ศ.2547 ในผู้ป่วยที่มีลักษณะคลินิกของหลอดเลือดแดงของขาอุดตันชนิดเรื้อรังและเฉียบพลัน และไม่สามารถคลำชีพจรบริเวณข้อเท้าได้ การวินิจฉัยโรคหลอดเลือดแดงของขาอุดตันจากแผ่นไขมันจะได้รับการยืนยันโดยภาพถ่ายทางรังสีของหลอดเลือดแดงของขาในขณะฉีดสารทึบรังสี, การตรวจพบแผ่นไขมันบริเวณผนังหลอดเลือดแดงในขณะทำการผ่าตัด และการตรวจพบหลอดเลือดแดงอุดตันจากแผ่นไขมันจากขาส่วนที่ถูกตัดทิ้ง การวางแผนเลือกวิธีการรักษาผู้ป่วยนั้นพิจารณาจากความรุนแรงของการขาดเลือดบริเวณขาส่วนปลาย, สภาพของหลอดเลือดแดงบริเวณขาส่วนปลาย และสภาพทั่วไปของผู้ป่วย วิธีการรักษาผู้ป่วยในการศึกษานี้ได้แก่ การผ่าตัดแก้ไขภาวะขาดเลือดบริเวณขา, การตัดขา และการตัดเนื้อเยื่อบางส่วนของเท้าที่เน่าตายหรือติดเชื้อ การศึกษานี้ได้ทำการวิเคราะห์ข้อมูลของผู้ป่วยในด้านลักษณะทางคลินิกของโรค, ปัจจัยเสี่ยง, โรคร่วมที่ตรวจพบ, วิธีการรักษา และผลการรักษา*

ผลการศึกษา: *ในการศึกษานี้ พบผู้ป่วยที่เป็นโรคหลอดเลือดแดงของขาอุดตันจากแผ่นไขมันจำนวนทั้งสิ้น 414 ราย โดยมีปริมาณความชุกของโรค 1.02 ต่อ 1,000 รายของผู้ป่วยที่รับไว้ภายในโรงพยาบาล ผู้ป่วยกลุ่มนี้เป็นเพศชาย 251 ราย และเพศหญิง 163 ราย ซึ่งมีอายุเฉลี่ย 66.9 ปี หลอดเลือดแดงบริเวณต้นขาเป็นตำแหน่งที่มีการอุดตันของโรคนี้มากที่สุด โรคเบาหวานเป็นปัจจัยเสี่ยงที่พบมากที่สุดคิดเป็นร้อยละ 61.1 ปัจจัยเสี่ยงอื่น ๆ ที่สำคัญของโรคนี้ ได้แก่ โรคความดันโลหิตสูง, การสูบบุหรี่ และภาวะไขมันในเลือดสูงโดยพบร้อยละ 52.4, 49.1 และ41.5 ตามลำดับ โรคร่วมที่พบในผู้ป่วยกลุ่มนี้ที่สำคัญได้แก่ โรคหัวใจขาดเลือด, โรคอัมพาต และโรคไตวายเรื้อรังโดยพบร้อยละ 26.1, 13.5 และ 4.8 ตามลำดับ ผู้ป่วยโรคนี้มีลักษณะทางคลินิกที่เกิดจากหลอดเลือดแดงอุดตันชนิดเรื้อรังเป็นส่วนใหญ่ คิดเป็นร้อยละ 93 และมีการขาดเลือดของขาอยู่ในขั้นรุนแรงร้อยละ 78.7 โดยมีอาการสำคัญของโรค ได้แก่ มีแผลขาดเลือดและเนื้อเยื่อเน่าตายบริเวณเท้าและส่วนปลายของขา ร้อยละ 60.6 ปวดเท้าในขณะพักจากการขาดเลือดอย่างรุนแรงร้อยละ 44 ปวดขาเวลาเดินในระยะทางสั้นร้อยละ 15 และปวดขาเฉียบพลันร้อยละ 7 นอกจากนี้ยังพบผู้ป่วยมีการติดเชื้อบริเวณเท้าหรือขาอย่างรุนแรงจำเป็นต้องรับการผ่าตัดเอาเนื้อเยื่อที่มีการอักเสบออกในขณะแรกรับไว้ในโรงพยาบาลสูงถึงร้อยละ 33.3 ผู้ป่วย 171 ราย (ร้อยละ 41.3) ได้รับการผ่าตัดแก้ไขภาวะขาดเลือด โดยมีความสำเร็จของการผ่าตัดร้อยละ 76.6 (131/171) มีการสูญเสียขาภายหลังการผ่าตัดแก้ไขภาวะขาดเลือดร้อยละ16.9 (29/171) และอัตราเสียชีวิตภายหลังการผ่าตัดแก้ไขภาวะขาดเลือดคิดเป็นร้อยละ 8.2 (14/171) นอกจากนี้ผู้ป่วยได้รับการตัดขาในช่วงแรกของการรักษาสูงคิดเป็นร้อยละ 24.9 (103/414) โดยมีสาเหตุจากการติดเชื้อร้อยละ 18.4 (76/414) และการขาดเลือดที่ไม่สามารถผ่าตัดแก้ไขได้ร้อยละ 6.5 (27/414) อัตราการเสียชีวิตภายหลังการตัดขาจากภาวะติดเชื้อและการขาดเลือดสูงถึงร้อยละ 19.7 (15/76) และร้อยละ 25.9 (7/27)ตามลำดับ อัตราการเสียชีวิตของผู้ป่วยทั้งหมดในการศึกษานี้คิดเป็นร้อยละ 11.3 (47/414) สาเหตุสำคัญของการเสียชีวิตของผู้ป่วยเหล่านี้ได้แก่ ภาวะติดเชื้ออย่างรุนแรง และโรคหัวใจขาดเลือด*

สรุป: *โรคหลอดเลือดแดงของขาอุดตันจากแผ่นไขมัน เป็นโรคที่ทำให้เกิดแผลขาดเลือดเรื้อรังและภาวะเน่าตายบริเวณเท้าและส่วนปลายของขาเป็นสาเหตุสำคัญของการสูญเสียขาในผู้ป่วยสูงอายุ นับเป็นปัญหาสำคัญของวงการสาธารณสุขไทย การผ่าตัดแก้ไขภาวะขาขาดเลือดโดยวิธีเปลี่ยนทางเดินหลอดเลือดแดงเป็นวิธีการรักษาที่มีประสิทธิภาพสูงสุดในการลดอัตราการสูญเสียขา ซึ่งเป็นการรักษาที่มีความยุ่งยากซับซ้อน ค่าใช้จ่ายสูง และจำเป็นต้องใช้แพทย์ผู้เชี่ยวชาญหลายสาขา การรักษาผู้ป่วยในการศึกษานี้ส่วนใหญ่กระทำในระยะสุดท้ายของโรคเป็นผลให้อัตราการเสียชีวิตภายหลังการรักษาอยู่ในเกณฑ์สูง ดังนั้นการวินิจฉัยโรคในระยะเริ่มแรกพร้อมกับให้การรักษาอย่างถูกต้องจะช่วยเพิ่มประสิทธิภาพในการดูแลรักษาผู้ป่วยเหล่านี้ การรณรงค์แก้ไขปัจจัยเสี่ยงของโรคควรถือเป็นนโยบายของการสาธารณสุขระดับประเทศในการลดอุบัติการณ์การสูญเสียขา และภาวะแทรกซ้อนอื่น ๆ ของโรคนี้ พร้อมทั้งจะช่วยการลดค่าใช้จ่ายในการดูแลรักษาโรคนี้เป็นอย่างดีอีกด้วย*