Surgery of the Abdominal Aorta : Experience of a University Hospital in Thailand

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Abstract

One hundred and thirty two patients who underwent aortic surgery at King Chulalongkorn Memorial Hospital, Bangkok, Thailand from January 1991 to December 2000 were studied. Twenty three patients (17.4%) were aged less than 60 years, 102 (77.3%) aged 60-80 years, and 7 (5.3%) were older than 80 years. Ninety eight patients (74.2%) underwent elective operations and 34 (25.8%) underwent emergency operations. Elective abdominal aortic aneurysms (AAA) repair was the most common indication for abdominal aortic surgery (56.0%). Eighteen patients (13.6%) underwent surgery for infected AAA. The incidence of infected AAA was 16.1 per cent among patients with AAA. Fifteen patients (11.4%) had ruptured AAA and 19 patients (14.4%) had aortoiliac occlusive disease. The overall mortality rate was 15.2 per cent. The mortality of elective aortic surgery was 5.1 per cent and of emergency aortic surgery was 44.1 per cent. The mortality of elective AAA repair was 4 per cent. Multiple system organ failure was the most common cause of death (80%), followed by acute myocardial infarction (10%) and exsanguination (10%). The authors conclude that elective surgery on the abdominal aorta is safe and should be performed when indicated to prevent the development of complications requiring emergency surgery which carries a much higher risk.

Key word : Abdominal Aortic Aneurysm, Ruptured Abdominal Aortic Aneurysm, Infected Abdominal Aortic Aneurysm, Aortoiliac Occlusive Disease

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Diseases of the abdominal aorta necessitating surgical interventions in Thai people and in Caucasians are similar in many aspects. Firstly, the pathological changes of the diseased aorta are mainly caused by atherosclerosis. Secondly, the elderly are commonly affected, and thirdly, risk factors are the same, i.e., smoking, diabetes mellitus, and hyperlipidemia. However, some differences are observed such as the high incidence of infected abdominal aortic aneurysms (infected AAA)[1,2] and lower incidence of abdominal aortic aneurysms (AAA) in Asian populations[3]. Furthermore, there is a trend toward emergency surgery owing to lack of screening protocol and unawareness of the aortic diseases in Thai people. Such deficiency has resulted in a significant number of patients being first admitted to the hospital with complications, i.e., ruptured AAA or acute aortoiliac thrombosis. While clinical presentations and results of treatment are well established in Western countries[4,5], publications regarding abdominal aortic surgery in Thai people are scarce[1,2,6-8]. The purpose of this study was to review patients who underwent abdominal aortic surgery at King Chulalongkorn Memorial Hospital, Bangkok, Thailand. Data analysis included indications for operations, treatment, results of treatment and causes of death.

PATIENTS AND METHOD

The medical records of patients who underwent abdominal aortic surgery at King Chulalongkorn Memorial Hospital, Bangkok, Thailand from January 1991 to December 2000 were reviewed. Urgency of the operations were classified into emergency and elective. Emergency operations were performed when the patients' lives or limbs were threatened, i.e. ruptured AAA, infected AAA, and acute aortoiliac thrombosis. Elective operations were performed on regular operative schedules, i.e., AAA repair and aortobifemoral bypass for aortoiliac occlusive disease. For infected AAA, diagnosis was made mainly from clinical presentations and operative findings. Clinical presentations included fever, back pain, leukocytosis, and positive blood cultures. Operative findings suggestive of infected AAA were the presence of frank pus and obvious infections of the aortic wall and periaortic tissues[1,2].

RESULTS

One hundred and thirty two patients entered into the study. One hundred and ten patients (83.3%) were males and 22 (16.7%) were females. The ages ranged from 25 to 90 years (mean 66.2 ± 11.53). Twenty three patients (17.4%) were aged less than 60 years, 102 (77.3%) were aged 60-80 years, and 7 (5.3%) were older than 80 years. Ninety eight patients (74.2%) underwent elective operations and 34 (25.8%) underwent emergency operations. Indications for operations are shown in Table 1. Elective AAA repair was the most common indication for abdominal aortic surgery at our institution (56.0%).

Eighteen patients had obvious clinical and operative findings of infected AAA which is 13.6 per cent of all patients or 16.1 per cent (18 in 112 patients) of patients with AAA. In 10 of them the responsible organisms were identified from cultures of the aortic wall, aneurysmal contents, or pus around the aorta. Salmonella species were the most common responsible organisms (Table 2). The remaining 8 patients had obvious clinical of infected AAA but the cultures were negative or not reported in the medical records. All patients who had infected AAA were treated by debridement of the infected aortic wall and removal of infected periaortic tissues. Revascularization of the lower extremities was performed with in situ graft placement in 14 patients, lateral repair of the aortic wall in 1 patient and closure of the aortic stumps and axillobifemoral bypass in 3 patients. Two patients who had in situ aortic graft placement died (14.3%) while all the patients who had aortic stump closure and extraanatomic bypass died (100%). The overall mortality for infected AAA was 27.8 per cent (5 in 18 patients) (Table 3).

The overall mortality rate of patients who underwent abdominal aortic surgery was 15.2 per cent (20 of 132 patients). Of the 20 patients who died, 5 had elective surgery while 15 had emergency surgery. The mortality rate in elective surgery was 5.1 per cent (5 of 98 patients). The mortality rate in emergency surgery was 44.1 per cent (15 of 34 patients). The mortality of elective AAA repair was 4 per cent. High mortality rate was found in patients with primary aortoenteric fistula (3 of 3 patients or 100%), AAA with acute mesenteric ischemia (1 of 1 patient or 100%), AAA with acute thrombosis or critical limb ischemia (1 of 2 patients or 50%), ruptured AAA (5 of 15 patients or 33.3%) and infected AAA (5 of 18 patients or 27.8%) (Table 1). When the mortality rates were calculated according to age group, they were 8.7 per cent (2 of 23 patients), 14.7 per cent (15 of 102 patients), and

Table 1. Indications for abdominal aortic surgery.

Indications	Number of patients	%	Number of deaths	%
Abdominal aortic aneurysms (elective repair)	74	56.0	3	4.1
Infected abdominal aortic aneurysms	18	13.6	5	27.8
Ruptured abdominal aortic aneurysms	15	11.4	5	33.3
Aortoiliac occlusive disease with critical limb ischemia or acute thrombosis	12	9.1	1	8.3
Aortoiliac occlusive disease with severe claudication or rest pain	7	5.3	1	14.3
Abdominal aortic aneurysms with critical limb ischemia	2	1.5	1	50
Primary aortoduodenal fistula	2	1.5	2	100
Primary aortocolonic fistula	1	0.8	1	100
Abdominal aortic aneurysms with acute mesenteric ischemia	1	0.8	1	100
Total	132	100	20	15.2

Table 2. Infected abdominal aortic aneurysms.

Responsible organisms (10 of 18 patients)	Number of patients
Salmonella group D	4
Salmonella group B	3
Salmonella group E	1
Enterobacter	1
Proteus vulgaris	1
Total	10

42.8 per cent (3 of 7 patients) in patients age group < 60 years, 60-80 years, and > 80 years, respectively.

Multiple system organ failure (MSOF) was the most common cause of death (80%) (Table 4). MSOF always followed severe infections and sepsis in patients with infected AAA. One patient with juxtarenal AAA who had supraceliac aortic cross clamping during operation developed fatal postoperative acute pancreatitis and subsequent MSOF. Other causes of death were acute myocardial infarction (10%) and exsanguination (10%).

DISCUSSION

Elective surgery on the abdominal aorta in the current study was relatively safe with a mortality rate of 5 per cent. When only elective AAA repair was considered, the mortality decreased to 4 per cent which is comparable to recent studies[4,9]. Acute pancreatitis which was responsible for the death of 1 patient who had juxtarenal AAA is a rare postoperative complication of AAA repair. The cause of acute pancreatitis in this patient was not certainly identified definitely but supraceliac aortic clamping and operative trauma to the pancreas during surgery were presumed to be predisposing factors[8]. Almost one half of the patients who underwent emergency abdominal aortic surgery in our study died. This reflects the seriousness of the situation; i.e., shock, severe infections, severe ischemic limbs in the relatively high risk patients (old age, underlying COPD, renal, or coronary artery disease). When a subgroup of patients who underwent emergency operations was analysed, approximately one-third of patients who had infected AAA and ruptured AAA died. Such a figure is acceptable compared to previous reports[10-13]. We obviously have a higher incidence of infected AAA (16.1%) than in Western countries whose incidence was 0.9 to 5 per cent [14-16]. The relatively low mortality rate in patients who had in situ graft placement after debridement of the infected aorta and periaortic tissues (14.3%) and the high mortality of patients who had aortic stump closure and extraanatomic bypass (100%) in the current study can be simply explained. Patients who had in situ graft placement had less severe infections than those who had aortic stump closure and extraanatomic bypass[2].

All patients who had primary aortoenteric fistulas died. The basic pathology of primary aortoenteric fistula was an AAA which had eroded and ruptured into the nearby hollow viscus (in this study ; 2 duodenum and 1 colon)[17-19]. All patients arrived at the emergency room in a state of shock

Table 3. Treatment of infected abdominal aortic aneurysms.

Treatment	Number of patients	Number of deaths
Aortic debridement with in situ graft placement	14	2
Aortic debridement with lateral suture of the aortic wall	1	-
Aortic debridement with aortic stump closure and extraanatomic bypass	3	3
Total	18	5 (27.8%)

Table 4. Causes of death in 20 patients.

Patient number	Age	Sex	Indications for operations	Type of operations	Causes of death
1.	73	Male	Juxtarenal AAA	Elective	Acute pancreatitis and MSOF
2.	69	Male	Aortoiliac occlusion with critical limb ischemia	Elective	MSOF
3.	61	Male	AAA with critical limb ischemia	Elective	Acute myocardial infarction
4.	66	Female	AAA with bilateral renal artery stenosis	Elective	MSOF
5.	61	Male	AAA	Elective	Acute myocardial infarction
6.	68	Female	Primary aortoenteric fistula	Emergency	Exsanguination
7.	87	Male	Primary aortoenteric fistula	Emergency	MSOF
8.	49	Male	Primary aortoenteric fistula	Emergency	MSOF
9.	64	Male	AAA with acute mesenteric ischemia	Emergency	MSOF
10.	49	Female	Ruptured AAA	Emergency	MSOF
11.	70	Male	Ruptured AAA	Emergency	MSOF
12.	76	Male	Ruptured AAA	Emergency	MSOF
13.	83	Male	Ruptured AAA	Emergency	Exsanguination
14.	87	Male	Ruptured AAA	Emergency	MSOF
15.	60	Male	Infected AAA	Emergency	Sepsis and MSOF
16.	70	Male	Infected AAA	Emergency	Sepsis and MSOF
17.	70	Male	Infected AAA	Emergency	Sepsis and MSOF
18.	64	Male	Infected AAA	Emergency	Sepsis and MSOF
19.	67	Male	Infected AAA	Emergency	Sepsis and MSOF
20.	60	Male	Aortoiliac occlusion with acute thrombosis	Emergency	MSOF

NB. MSOF = Multiple system organ failure

from massive gastrointestinal bleeding. This underlines the importance of elective repair of AAA before complications occur.

The overall mortality for aortofemoral bypass in aortoiliac occlusive disease in the current study was 10.5 per cent (2 of 19 patients) which is obviously higher than the rate of 2.3 per cent previously reported when operations were performed by experienced surgeons[20-22]. However, the number of patients who underwent operative correction for occlusive disease was too small to give a meaningful analysis. This small number of occlusive disease may indicate the low incidence of aortoiliac occlusive disease in Thai people.

SUMMARY

Surgery on the abdominal aorta in authors' institution was carried out with acceptable outcome. Elective surgery for the AAAs was relatively safe with a mortality rate of 4 per cent. Primary aortoenteric fistulas had the highest mortality (100%). Infected AAAs were frequently encountered and should arouse suspicion in AAA patients who also had fever, leukocytosis and back pain. Although the results of treatment of infected AAA in severe cases were dismal, satisfactory results were obtained in early or mild cases. The number of patients who underwent surgery for aortoiliac occlusive disease in this study was too small to draw conclusion. Since

the overall mortality rate of emergency aortic surgery is relatively high, early detection of aortic diseases and subsequent elective surgery when indicated are recommended to avoid emergency operations with high post-operative complications and mortality.

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การผ่าตัดรักษาโรคของหลอดเลือดแดงเอออร์ตาในช่องท้อง : ประสบการณ์ของโรงพยาบาล มหาวิทยาลัยแห่งหนึ่งในประเทศไทย

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ได้รายงานผลการผ่าตัดรักษาผู้ป่วยที่เป็นโรคของหลอดเลือดแดงเอออร์ตาในช่องท้องที่โรงพยาบาลจุฬาลงกรณ์ ระหว่างเดือนมกราคม พ.ศ. 2534 ถึงเดือนธันวาคม พ.ศ. 2543 จำนวน 132 ราย ผู้ป่วย 23 ราย (ร้อยละ 17.4) มีอายุน้อยกว่า 60 ปี ผู้ป่วย 102 ราย (ร้อยละ 77.3) อายุระหว่าง 60-80 ปี ผู้ป่วย 7 ราย (ร้อยละ 5.3) มีอายุมากกว่า 80 ปี ผู้ป่วย 98 ราย (ร้อยละ 74.2) ได้รับการผ่าตัดตามหมายกำหนดการปกติ (elective operation) และผู้ป่วย 34 ราย (ร้อยละ 25.8) ได้รับการผ่าตัดฉุกเฉิน (emergency operation) การผ่าตัดที่ทำบ่อยที่สุดคือการผ่าตัดซ่อมแซมหลอดเลือดแดงเอออร์ตาในช่องท้องโป่งพองตามหมายกำหนดการปกติ (elective AAA repair) (ร้อยละ 56.0) ผู้ป่วย 18 ราย (ร้อยละ 13.6) ได้รับการผ่าตัดรักษาภาวะติดเชื้อของหลอดเลือดแดงโป่งพองในช่องท้อง (infected AAA) อุบัติการณ์ของภาวะติดเชื้อของหลอดเลือดแดงเอออร์ตาโป่งพองในช่องท้อง ในรายงานนี้คิดเป็นร้อยละ 16.1 ของผู้ป่วยที่มีภาวะหลอดเลือดแดงเอออร์ตาโป่งพองในช่องท้องทั้งหมด ผู้ป่วย 15 ราย (ร้อยละ 11.4) ได้รับการผ่าตัดรักษาภาวะหลอดเลือดแดงเอออร์ตาโป่งพองในช่องท้องแตก (ruptured AAA) ผู้ป่วย 19 ราย (ร้อยละ 14.4) ได้รับการผ่าตัดรักษาภาวะหลอดเลือดแดงเอออร์ตาและอิลิแอกตีบตัน (aortoiliac occlusive disease) ผู้ป่วยในรายงานนี้เสียชีวิตร้อยละ 15.2 อัตราตายในการผ่าตัดตามหมายกำหนดการปกติ (elective operation) คิดเป็นร้อยละ 5.1 อัตราตายในการผ่าตัดฉุกเฉิน (emergency operation) คิดเป็นร้อยละ 44.1 อัตราตายในการผ่าตัดซ่อมแซมหลอดเลือดแดงเอออร์ตาโป่งพองในช่องท้องตามหมายกำหนดการปกติเท่ากับร้อยละ 4 การสูญเสียการทำงานของอวัยวะต่าง ๆ (multisystem organ failure) เป็นสาเหตุตายที่พบบ่อยที่สุด (ร้อยละ 80) รองลงมาคือกล้ามเนื้อหัวใจตายเฉียบพลัน (ร้อยละ 10) และเลือดออกมาก (ร้อยละ 10) จากข้อมูลดังกล่าวผู้รายงานมีความเห็นว่าการผ่าตัดรักษาโรคของหลอดเลือดเอออร์ตาในช่องท้องควรทำตามหมายกำหนดการปกติ (elective operation) เมื่อผู้ป่วยมีข้อบ่งชี้เนื่องจากการรอจนเกิดภาวะแทรกซ้อนและต้องมาทำผ่าตัดฉุกเฉิน (emergency operation) มีความเสี่ยงและอัตราตายสูงกว่ามาก

คำสำคัญ : หลอดเลือดแดงเอออร์ตาในช่องท้องโป่งพอง, ภาวะติดเชื้อของหลอดเลือดแดงเอออร์ตาโป่งพองในช่องท้อง, ภาวะหลอดเลือดแดงเอออร์ตาโป่งพองในช่องท้องแตก, ภาวะหลอดเลือดแดงเอออร์ตาและอิลิแอกตีบตัน

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