

STUDY OF ARTERIAL ANEURYSMS

Pages with reference to book, From 265 To 267

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ABSTRACT

A review of 46 patients operated for arterial aneurysms over an eight years period is presented. Twenty-nine patients developed aneurysm following vascular trauma while 17 had atherosclerotic aneurysms. Thirty-one patients presented with painless swelling or swelling with mild pain and four patients with frank rupture. Reconstruction was successful in all cases with a peri-operativ mortality of only 4.3%. Unlike western countries, trauma is the leading cause of aneurysm and aneurysms can be managed with minimal morbidity and mortality (JPMA42: 265, 1992).

INTRODUCTION

Etiology and natural history of different aneurysms has been clearly identified with emphasis to treat the disease in asymptomatic stage. Technical developments in vascular surgery and improved life support mechanisms have made it possible to attack almost every aneurysm irrespective of its location and presentation. The present study was undertaken to identify the circumstances in which the disease is present in our country and to see how effectively we can utilize the resources of a non-specialized unit to deal with this techhically complicated problem.

PATIENTS AND METHODS

Fifty-five patients of arterial aneurysms were seen between September, 1983- September, 1991. Eight patients went abroad for further treatment (five with abdominal aortic aneurysm and one each with thoracic, popliteal and renal artery aneurysms), while one with popliteal artery aneurysm came with established gangrene and underwent above knee amputation. These nine patients were, therefore, excluded from the study. All patients were operated using standard vascular surgical technique of proximal and distal control of involved vessel, minimal dissection of aneurysmal sac and in-lay graft. Heparin was only used intraoperatively. Saphenous vein graft (SVG) was used for reconstruction of vessels measuring 6mm or less and also in bigger sized vessel whenever synthetic grafts were not available. Synthetic grafts were used in vessels over 6 mm in diameter. Synthetic graft material used was gortex, knitted dacron and teflon. Different materials were used depending more on availability than on scientific preference. Preoperative arteriograms were only done in patients operated electively. Some patients in elective group were also operated without preoperative arteriograms because of limited resources and, during the latter years, because of reliance about anatomical location and distal outflow based on clinical, doppler and ultrasound examination. Patients were first classified depending upon the etiology. Diagnosis of traumatic false aneurysm was made when the aneurysm arose in a patient with history of trauma to that region and confirmed subsequently. Aneurysms were labelled atherosclerotic when histopathology showed evidence of atherosclerosis in the wall, irrespective of the fact whether clinical picture was consistent with atherosclerotic vascular disease or not but a note of atypical situation was made. A second classification was designed to show the vessel of origin of the aneurysm and its relationship to the etiology. A third classification was established to divide the patients according to the mode of presentation to the medical facility and grouped accordingly; asymptomatic when patient had no symptoms with the swelling; swelling with mild pain if pain

developed gradually with the swelling; impending rupture if sudden, severe and persistent pain developed with an increase in size of a known swelling; ruptured aneurysm if patient presented with blood outside the walls of the aneurysm (retroperitoneal hematoma or bleeding ulcerated skin over the aneurysm); and distal ischaemia if patient had presented with ischaemia of the extremity due to thrombosis of or embolization from the aneurysm. Also a note in mode of presentation was made if the swelling was diagnosed as an aneurysm preoperatively or intraoperatively.

RESULTS

Trauma was the leading cause of aneurysms seen in the series, i.e., 29/46(63%) patients (Table I).

TABLE I. Etiology and vessels involved.

Vessels	No.	Traumatic	Atherosclerotic
Femoral artery	12	11	1
Abdominal aorta	8	0	8
Subclavian axillary arteries	7	7	0
Carotid artery	6	6	0
Popliteal artery	5	3	2
Iliac artery (isolated)	3	1	2
Thoracic aorta	2	0	2
Branchial artery	1	1	0
Superior mesenteric artery	1	0	1
Splenic artery	1	0	1
Total	46	29	17

Remaining 17 (37%) were diagnosed as atherosclerotic aneurysms. Table I also shows the breakdown depending upon the vessels involved and their relationship to the etiology. Traumatic aneurysms mainly involved the extremities i.e., 23/29 patients, with femoral artery being the most common vessel. There were 6 patients with traumatic carotid artery aneurysms, 11 of the 29 traumatic aneurysms had associated arteriovenous fistula with evidence of high output failure (dyspnoea, tachycardia and cardiomegaly) in three cases. Infrarenal abdominal aorta and common iliac artery was the most common location for atherosclerotic aneurysms, i.e., 10/17, followed by descending thoracic aorta and popliteal artery with two each. In 13/17 patients labelled as atherosclerotic, clinical presentation, i.e., age of patient, vessel involved were consistent with the usual picture of atherosclerotic aneurysms. In 4 patients histopathology showed atherosclerosis but clinical picture was not typical. First was an eighteen year old girl with thoracic aneurysm which grew salmonella on culture of the arterial wall. She also had an abdominal aortic aneurysm which is yet to be operated. Second was a 28 year old male with aneurysm of superior mesenteric artery. Third was a 30 year old female with a ruptured splenic artery aneurysm. Fourth was a 30 year old female with a typical looking atherosclerotic abdominal aortic aneurysm. Except for these four, all the remaining 13 patients diagnosed as with atherosclerotic aneurysms were above 50 years of age. Mode of presentation to the medical facility is shown in Table II,

TABLE II. Mode of presentation.

Clinical features	Pre-operative diagnosis of aneurysm	Intra-operative diagnosis of aneurysm	Total
Asymptomatic swelling	15	-	15
Distal ischaemia	-	1	1
Impending rupture	9	1	10
Painful swelling	16	-	16
Ruptured	2	2	4

alongwith the timing of diagnosis, i.e., preoperative or intraoperative. In four patients, the diagnosis was made intraoperatively (one operated for acute ischaemia had thrombosed popliteal artery aneurysm, while others had ruptured abdominal aortic aneurysm, ruptured splenic artery aneurysm and impending rupture of superior artery aneurysm). Four patients had presented with ruptured aneurysms. Of these one had abdominal aortic aneurysm and another had splenic artery aneurysm. Other two cases came with sudden increase in size of an aneurysm (traumatic popliteal and carotid artery aneurysms) with ulceration and oozing of blood from the overlying skin. All these were operated immediately. Ten patients presented with impending rupture of aneurysms. All these patients were operated within 24 hours after making preoperative arrangements but without obtaining arteriograms. Two of these were atherosclerotic aneurysm (abdominal aorta and superior mesenteric artery), while remaining 8 were traumatic aneurysms. Sixteen patients had history of mild pain associated with an aneurysm, while fifteen had no pain at all. All these were operated electively. Preoperative arteriograms were done in only 25 out of these 31 patients. Ligation of the aneurysm alone, without repair, was done in only two patients (one had ruptured splenic artery aneurysm and the other a ruptured carotid artery aneurysm with already thrombosed internal carotid artery). Reconstruction of the involved vessel was carried out in all of the remaining 44 patients. Saphenous vein graft was used in 20 patients and synthetic grafts were used in 24 patients. No amputations were required in any patients. No neurological deficits were seen in patients operated for carotid artery aneurysm. Similarly no nerve injury due to aneurysmal dissection was seen. All patients operated for ruptured aneurysm survived. Early reoperations were done in two cases, one for bleeding from intercostal vessel in patient after reconstruction of thoracic aortic aneurysms. A planned second look operation was done 24 hours after reconstruction of superior artery aneurysm and resection of two feet of infarcted jejunum was done. No early graft occlusion or anastomotic bleeding was seen. Infection was seen in four patients. Two had superficial wound infections which were controlled easily. One had infection in the bone requiring sequestrectomy. Graft infection was seen in a patient with gortex graft in the groin. The graft became visible after the wound infection. Infection was controlled and wound healed without sacrificing the graft. Grafts were open in all patients upto the average one year follow-up (minimal follow-up was six months). One patient with resection of popliteal artery aneurysm came back nine months later with distal occlusive disease and an open graft. Two out of these forty six patients died, one died of myocardial infarction 24 hours after surgery for impending rupture of abdominal aortic aneurysm and the other with iliac artery (traumatic) aneurysm died of massive pulmonary embolus on fourth postoperative day.

DISCUSSION

Aneurysmal disease is a major vascular problem after occlusive vascular disease. The two common etiological factors observed in this series were trauma and atherosclerosis. Unlike western countries where atherosclerotic aneurysms are the most common type¹, a high frequency of traumatic aneurysms in this study may be due to increased frequency of trauma and missed vascular injuries which may later on present as aneurysms. At the time of initial vascular injury bleeding takes place in surrounding tissue, because of pressure of the surrounding tissue, the hematoma is contained. Later the hematoma is converted into a sac lined by collagen and it communicates with the injured vessel and forms false aneurysm². All hematomas or swellings whether pulsatile or otherwise, which appear after an injury especially in the extremity should be considered as aneurysms and explored unless proven otherwise. A common presentation of atherosclerosis is aneurysmal dilatation of the diseased vessel. It is still not clear if aneurysm is an accelerated form of atherosclerotic degenerative process of the arterial wall or is a nutritive change in the vessel wall secondary to occlusion of vasa vasorum. It is difficult to differentiate between degenerative arterial disease (atherosclerosis, cystic medial necrosis and fibromuscular dysplasia) as the etiology of arterial aneurysm. Site is more often used as differentiating factor, like atherosclerosis in infra-renal aortic aneurysm, fibromuscular dysplasia in renal artery aneurysm and mycotic in superior mesenteric artery aneurysm³. Atherosclerosis is the biggest killer in the western World and aneurysmal dilatation of infra-renal abdominal aorta is a common manifestation of this disease. About 2.8% of elderly population, i.e., over 60 years of age in western countries has abdominal aortic aneurysm and 40% of all these patients will die over the next five years because of the rupture of their abdominal aortic aneurysm^{1,4}. Atherosclerosis is on the rise in this country. This has not been reflected in the form of increase in aneurysmal disease, but enough cases are seen, as shown in this study, to presume that cases are being missed. Moreover, atherosclerotic heart disease seems to affect younger age group; as this age group goes to live in its seventh and eighth decade of life we would be seeing more atherosclerotic aneurysmal disease. Atherosclerotic aneurysms are seen in young age also, i.e., below 30 years as shown in this study and this has been observed in Mayo Hospital Lahore also (personal communication - Dr. Shamim Khan), especially in females. We are not sure if this is true atherosclerotic disease or is some form of arteritis (mycotic or autoimmune) which histologically resembles atherosclerosis, as one of our patients grew salmonella typhi from the wall and there are reports of tuberculosis causing arteritis⁵. Arteriography is an important tool but it cannot show the true size of aneurysm which usually contains layers of clots along the aneurysmal wall. Main role of arteriography is to identify the relationship of branches of the vessel with the aneurysm. Doppler ultrasound studies have made it possible to get the necessary information without the need of arteriography^{6,7}. Mortality rate of less than 5% (2 out of 46) is not high, especially considering the fact that this study is not from a specialized center. Wound infection rate of about 5% and graft infection rate of less than 2% is comparable to western studies⁸. Concept of salvaging infected grafts without removal is shown in this study, as is being reported frequently by others⁹.

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