Ruptured Abdominal Aortic Aneurysms: A Personal Experience

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ABSTRACT

Despite advances in surgical technique and peri-operative care, mortality from ruptured abdominal aortic aneurysm presenting to a hospital remains around 50%. This is in contrast to the mortality rate of < 5% for elective repair. In a two and a half year period, the principal surgeon operated on 10 patients with ruptured AAA, with a peri-operative and overall mortality of 30%. One of the ten patients had a ruptured mycotic aneurysm. We present our experience with these patients and also correlate this with recent publications.

Keywords: ruptured abdominal aortic aneurysm, mycotic aneurysm

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INTRODUCTION

The incidence of abdominal aortic aneurysm (AAA) is on the rise and this is attributed to increased detection using modern diagnostic tools, ageing of the population and a probable real increase in the incidence of AAAs[1]. The overall mortality rate for elective MA repair is now < 5%, whereas mortality of ruptured AAAs presenting to a hospital is around 50%. We present our experience with 10 patients, including one with a ruptured mycotic aneurysm correlate this with recent publications.

MATERIALS AND METHODS

This is a retrospective outcome study. Ten patients were operated on for ruptured abdominal aortic aneurysm by the principal surgeon (JTCH) in a consecutive period from September 1997 to March 2000. A ruptured aneurysm, identified either radiologically or during surgery, was indicated by a retroperitoneal haematoma or free blood in the peritoneal cavity, in the absence of a cause for the bleeding other than the aneurysm. Data was collated from case notes, operation reports and anaesthesia records after review by the author. Operative mortality was defined as death within 30 days of operation.

RESULTS

There were 8 males and 2 females with a mean age of 72.6 years (61 to 85 years). There were 3 patients who were more than 80 years old. The most common presenting complaint was abdominal pain (5 patients). The other 5 patients each presented with diaphoresis, right loin pain, shortness of breath, giddiness and per-rectal bleeding respectively. The patient who presented with per-rectal bleeding had a ruptured mycotic aneurysm with primary source of infection from the gut. The other nine patients had ruptured artherosclerotic aneurysms.

Six patients were hypertensive, five had ischaemic heart disease, one of whom had a coronary artery bypass graft done 2 years prior to the rupture. Four patients were diabetic, three had chronic obstructive airway disease, two suffered from mild strokes and one had mild renal impairment. Of the 10 patients, two had known histories of abdominal aortic aneurysm. One of them was an 85-year-old lady with hypertension, mild stroke and renal failure, who was followed up by the principal surgeon. Her infra-renal AAA was first diagnosed in October 1999, measuring 5.6 cm diameter then. Elective repair was offered but the family had refused. The other patient with a history of AAA presented with equivocal signs and symptoms, but was operated on based on the history. One patient had a documented history of transient loss of consciousness. She also had evidence of an acute myocardial infarction pre-operatively.

Six patients had pre-op hypotension as defined by a systolic BP of <= 80 mmHg. This was the lowest recorded BP either at the emergency department, in the wards or in the OT before opening the abdomen. The mean pre-op Hb was 10.1 g/dL (7.7 to 11.4 g/dL). Pre-operative creatinine levels ranged from 84 umol/L to 386 umol/L. Six patients had pre-operative CT scans done to investigate the cause of acute abdomen. The other 4 were taken straight to the OT because of presumptive diagnosis of ruptured AAA and haemodynamic instability. The time elapsed when the patient was first seen at the emergency department to when the abdominal incision was made ranged from 1.5 hours to 2 days.

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Table 1. Summary of the 10 patients.

S/N	Initials	Sex	Age	Surgery	Aneurysm	Rupture	Graft	Duration	Status	Follow-up
1	HSP	Male	79	30/09/97	Arthero	RetroP	Straight	3 hours	Alive	3 months
2	CCS	Male	65	16/04/98	Arthero	RetroP	Bifurcated	3.3 hours	Alive	24 months
3	IBA	Male	70	23/05/98	Arthero	IntraP	EA	1.7 hours	Died	
4	NSM	Male	65	15/07/98	Mycotic	RetroP	EA	7 hours	Alive	18 months
5	ASC	Male	72	25/11/98	Arthero	RetroP	Straight	2 hours	Died	
6	SHY	Male	81	25/02/99	Arthero	IntraP	Bifurcated	2.5 hours	Died	
7	TSL	Female	84	27/05/99	Arthero	RetroP	Straight	1.5 hours	Alive	10 months
8	WSH	Male	61	03/10/99	Arthero	RetroP	Bifurcated	4.9 hours	Alive	4 months
9	SWY	Female	85	14/03/00	Arthero	RetroP	Straight	1.25 hours	Alive	1 month
10	BBA	Male	64	22/03/00	Arthero	IntraP	Straight	1.75 hours	Alive	1 month

Arthero = Artheromatous,   RetroP = Retroperitoneal,   IntraP = Intraperitoneal,   EA = Extra-anatomical.

All ten patients had ruptured infra-renal aneurysms. The mean diameter measured either on CT scan or intra-operatively was 7.5 cm (range 6 to 10.8 cm). The common iliac arteries were involved in 3 cases. Seven ruptured into the retro-peritoneal space, whereas the other 3 were intra-peritoneal ruptures. The amount of haemoperitoneum ranged from 0.5 litres to 2.5 litres. Intra-operative transfusion of blood and blood products ranged from 0.34 litres to 10.86 litres (mean 4.47 litres). The aortic clamp time ranged from 30 to 79 minutes (mean 52 minutes). Duration of the operation was a mean of 2.4 hours (1.25 to 4.9 hours). Straight grafts were used in 5 patients and bifurcated grafts in 3 patients. Extra-anatomical axillo-bifemoral grafts were used in the remaining 2 patients.

All patients were kept intubated immediately post-op and were transferred to the intensive care unit. The average length of stay and duration of intubation was 4.3 days (range 1 to 20 days) and 3.1 days (range 1 to 16 days) respectively. One patient needed a tracheostomy for prolonged intubation due to pneumonia. Of the 10 patients, 7 are still alive and well. The remaining 3 died in the perioperative period, 2 of them died within the 1st 24 hours, the 3rd patient died on the 3rd POD. The average length of stay in hospital was 18.3 days (range 8 to 48 days).

Of the 7 surviving patients, 2 patients developed septicaemia secondary to pneumonia, 1 had suggestion of ischaemic colitis, all had coagulopathy to a certain extent. One patient needed a tracheostomy but none had to be re-operated upon abdomen wise. The patient who developed ischaemic colitis was a 64 year old male who had per-rectal bleeding on the 6th POD. His Hb dropped 1 g/dL but remained haemodynamically stable. He was treated conservatively with the plan for a colonoscopy at a later date. One patient developed graft occlusion 1 year after repair of a ruptured mycotic aneurysm with an extra-anatomical axillo-bifemoral graft. He had complained of severe claudication and an angiogram done showed occlusion of the left femoral graft as well as the left superficial femoral artery. He subsequently underwent a mainstem graft to left profunda bypass as well as a left profunda to popliteal bypass of the SFA occlusion.

The aforementioned patient was the only patient in the series with a ruptured mycotic aneurysm. He presented with complaints of malaise, loss of weight and appetite, as well as passage of black stools. A gastroscopy just showed gastritis. A CT scan of the abdomen was thus performed to exclude a malignancy in view of the history, and this showed a leaking infra-renal aneurysm. Laparotomy was performed and findings were that of a 6 cm infra-renal mycotic aneurysm with contained rupture. Pus was extruded when the aneurysm was incised. The gall bladder was also noted to be distended. An extra-anatomical axillo-bifemoral bypass was performed and the aneurysm was excised. Post-op blood and stool cultures grew Salmonella enteritidis. Review of the CT scan done pre-operatively also revealed a distended gallbladder with thickened walls and pericholecystic fluid, without any evidence of gallstones. He was treated for acalculous cholecystitis with secondary mycotic seedings.

Three patients died in the perioperative period. The surviving 7 patients were followed up for a period of 1 to 24 months (mean 8.7 months). All are currently alive and relatively well. Thus the pert-operative and overall mortality in this series is 30%. Table I summarises the data of the 10 patients.

DISCUSSION

In a recent publication, Prance and co-workers[1] investigated the effect that 5 risk factors had on operative mortality; namely age (>76 years), creatinine (>190

umol/L), haemoglobin (<9 g/dL), loss of consciousness and ECG evidence of ischaemia. They found that cumulative effect of 0,1 and 2 risk factors on mortality were 18%, 28% and 48% respectively. All patients with 3 or more risk factors died. Looking at the patients in our series that died, 1 had none of the above risk factors, 1 had 1 risk factor and 1 had 2 risk factors. In contrast, among the survivors, 1 had no risk factors, 4 had 1 risk factor, 1 had 2 risk factors and 1 had 4 risk factors. The patient with 4 risk factors was a 84-year-old lady who presented with sudden shortness of breath and transient loss of consciousness. She had a pre-op Hb of 8.4 and a normal creatinine. She also had ECG as well as haematological changes of an acute myocardial infarction. Her post-operative recovery was uneventful and in fact, she had the shortest length of stay in hospital (8 days) among all the patients. When last seen during a routine follow-up 10 months after surgery, she was well and ambulating.

Many authors have tried to identify risk factors that may predict operative mortality[2-7]. Though each may have convincing data to support the effect of several pre-operative variables on a poor outcome, there has not been a uniform agreement on any of these variables and thus an absolute mortality risk has not been demonstrated. In particular, several of these papers did not find any pre-operative comorbid medical conditions (if raised creatinine is excluded as it may not only reflect a pre-operative comorbid condition but also frequently expresses the multi-organ consequence of hypovolaemia in these patients) that could predict death[5-7]. Moreover, age has often been found not to be an independent risk factor for operative mortality[5,7,8]. Hence, even in elderly patients with pre-operative comorbidity, the option of surgery for ruptured AAA should not be denied. Rather, decision should be made on an individual basis, because although surgical mortality rates remain high, rupture is always fatal without operative treatment. We have operated on almost all patients presenting with a ruptured AAA irregardless of age and comorbid factors.

A major challenge is to identify and increase the pick-up rate of AAA before they rupture. Early diagnosis and elective management of aortic aneurysms return life expectancy to normal[9]. At our institution, ruptured AAAs account for more than 50% of operative cases. In an analysis of AAA surgery spanning 4 decades, Chen JC et al[10] found that the ratio of non-ruptured to ruptured MA increased from 2.4:1 in the first decade to 3.4:1 in the last 5 years of the study period. For the non-ruptured AAA repair, peri-operative mortality also improved from 17.0% to 3.4%, although no improvement of operative mortality rates was seen for the ruptured AAAs. A physical examination cannot be relied upon for screening patients suspected of having an AAA as its sensitivity ranges from 22 to 96%[11]. Ultra-sonography, in particular duplex ultrasound, is a relatively cheap and reliable test for detecting AAA with a sensitivity of between 82 and 90%[12]. The cost of identifying a 4 cm or greater AAA is about 2.5 to 7% of the cost of identifying a single breast cancer using physical exam and screening mammography[13]. Ascher et al[11] in their paper comparing ruptured versus elective AAA repair found a 4 times difference in the cost. The average length of stay for a patient undergoing ruptured AAA repair was 42 days as compared to 12 days for a patient undergoing elective AAA repair. Several authors have also noted a familial tendency of AAA[14-16]. Thus, there are select patient populations that have an increased incidence of AAA, namely males over age 65 with history of symptomatic PVD, carotid occlusive disease, ischaemic heart disease, hypertension and tobacco use. Screening this population with abdominal ultrasound would be justified to preferentially repair AAA prior to rupture and hence reduce the cost, and mortality and morbidity from ruptured AAA repair.

CONCLUSION

With the ageing population in Singapore and the shift towards western disease patterns, the incidence of AAAs is on the rise with a significant number presenting with rupture. Ruptured AAAs still poses a great challenge to vascular surgeons despite advances in operative technique and improvements in peri-operative care. A screening program could be implemented to reduce the operative mortality and morbidity.

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