Original article

Abdominal aortic aneurysm and gastrointestinal disease: should synchronous surgery be considered?

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Background: Abdominal aortic aneurysm (AAA) is relatively common in an age group in which other abdominal pathologies have an increasing incidence. The co-existence of an aneurysm with a second intra-abdominal pathology presents a difficult management problem for the surgeon. Synchronous aortic and gastrointestinal surgery is often avoided due to the perceived higher risk of infection of the vascular prosthesis.

Methods: Cases of synchronous AAA repair with a second gastrointestinal/biliary procedure were identified from the operative records of a single vascular surgeon working in a district general hospital.

Results: Eight cases were identified over a 10-year period, comprising 3 large bowel resections, 2 cholecystectomies and 3 upper gastrointestinal operations as the second synchronous procedure. No graft infections were recorded in this group and there was one death within 30 days.

Conclusions: From our experience and a review of the available literature we conclude that synchronous aortic and gastrointestinal surgery should be considered when urgent surgery for both conditions is indicated.

Key words: Abdominal aortic aneurysm – Co-existent intra-abdominal pathology – Synchronous aortic and gastrointestinal surgery

The dilemma of the surgeon faced with a second intra-abdominal pathology in addition to an abdominal aortic aneurysm (AAA) has been noted for many years. Lobbato *et al.*¹ reported a survey of 46 American professors of general and vascular surgery, only two of whom would have advocated a combined approach for rectal cancer and AAA in 1985.

AAAs are common in the UK male population with a prevalence of 4.3–9.9%^{2,3} depending on the age group studied. Colonic cancer occurs in the same age group, as do other intra-abdominal pathologies that need urgent treatment. As a consequence, AAA and co-existing abdominal pathology will inevitably occur.

The presence of neoplastic lesions in patients who have an AAA was reported as 3.9%.⁴ The prevalence of colorectal carcinoma at the same time as an AAA is diagnosed is low, however, with one study reporting it at 0.49%.⁵ To add to the dilemma, laparotomy without aneurysm repair has an increased incidence of aneurysm rupture in the postoperative period.⁶

The problem as to which pathology to operate on first is heightened when one considers malignant disease, due to the perceived higher risk of disease progression or complication if resection of the primary is delayed. Studies have also reported a similar problem in biliary disease with a high incidence of postoperative biliary

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tract complications, especially in those with symptomatic gallstones, after laparotomy for another reason.⁷ The benefits of concomitant cholecystectomy include prevention of postoperative cholecystitis or cholangitis as well as the elimination of the need for a subsequent operation.⁸

The main concern for those who would advocate an approach of simultaneous gastrointestinal and vascular procedures is the risk of infection of the vascular graft. If the decision has already been made that surgery is appropriate for both conditions, then there would appear to be three options. Firstly, to operate initially on the aneurysm, going back at a later date to deal with the second pathology, and accepting the potential for progression or complications. Secondly, the aneurysm surgery can be deferred and performed as a subsequent procedure, with the increased risk of a rupture of the AAA after laparotomy. Finally, to operate on both pathologies at the same procedure, usually repairing the aneurysm first and then, if the patient is stable, proceeding to the second part of the operation for the concomitant pathology⁷ with the possible increased risk of graft infection.

We present a series of combined gastrointestinal and aneurysm repair procedures undertaken by a single surgeon (RAPS) working in a district general hospital.

Patients and Methods

Copies of typed operating notes of all vascular procedures from a single vascular surgeon were available from 1991. Cases were identified as those who had undergone a second

procedure, which involved opening the gastrointestinal or biliary tracts, at the same time as an AAA repair, thus exposing the graft to a potentially higher risk of infection. The case notes for these patients were examined and their hospital stay and postoperative follow-up noted.

A MedLine search was performed to identify reports of other series of such procedures and of the approaches to the management of patients with aneurysms who were found to have a second intra-abdominal pathology.

Results

The results of the study are summarised in Table 1. Eight cases were identified and notes were available for all. There were 3 women and 5 men with an average age at surgery of 77.5 years (range, 68–84 years). At operation, the average size of aneurysm was 6.5 cm (range, 5.4–7.7 cm). Three of the aneurysms were detected by the Chichester aneurysm screening programme, 2 were identified in the course of pre-operative staging investigations for colorectal cancer, and the remaining 3 were found in patients admitted acutely with upper gastrointestinal symptoms.

The second procedures undertaken at the same time as the aortic surgery included:

1. Two cholecystectomies, one as an emergency for an acutely inflamed gall-bladder, the other as an elective case, in a patient with symptomatic gallstones.
2. Three upper gastrointestinal procedures (one bleeding DU, one aortoduodenal and one aortojejunal fistula). Both the fistulae were in women with inflammatory

Table 1 St Richard's Hospital experience of combined aortic and gastrointestinal surgery

	Year	Age at surgery	Sex	Method of AAA detection	Second procedure	Diameter of AAA at surgery (cm)	ITU stay (days)	In-patient stay (days)	Outcome/follow-up	Evidence of graft infection?
1	1992	77	F	Screening 1990	Closure of aorto-duodenal fistula	6.0	2	17	Died 4 years postoperatively	None
2	1995	68	F	Investigation of haematemesis and collapse	Closure of aortojejunal fistula	7.0	2	16	Well 6 years postoperatively	None
3	1996	74	M	Investigation of epigastric pain	Cholecystectomy	5.4	2	2	Died at 2 days from PE	–
4	1997	77	F	Screening 1990	Closure of mucus fistula	6.3	1	8	Well at 2 years postoperatively	None
5	1998	80	M	Screening 1992	Excision and oversewing of bleeding duodenal ulcer	6.4	6	22	Well at 3 years postoperatively	None
6	1998	81	M	Staging USS for rectal cancer	Total colectomy	7.7	2	15	Well at 3 years postoperatively	None
7	1999	84	M	Investigation of biliary colic	Cholecystectomy	6.7	5	20	Well at 1 year postoperatively	None
8	2001	79	M	Staging USS for rectal cancer	Abdominoperineal resection	6.3	4	15	Died at 37 days from MI	–

aneurysms. A third patient had an aneurysm repair at the same time as an emergency laparotomy for an acutely bleeding duodenal ulcer.

3. The final three cases involved colonic operations. One patient, who had previously undergone a subtotal colectomy for ulcerative colitis, had a mucus fistula resected and closed at the same time as the elective AAA surgery. Two other patients had surgery for colorectal cancer combined with their aneurysm repairs. In both cases, the aneurysms were detected in the course of staging investigations.

All patients were nursed in intensive care following their operations and all but one (who died at 2 days from a pulmonary embolus following aneurysm repair and cholecystectomy) survived to discharge. A further patient died at 37 days from a myocardial infarct. The average stay in the intensive care unit was 3.0 days (range, 1–6 days) with the mean time to discharge home following surgery 16.1 days (range, 8–22 days). Follow-up, excluding the 2 early deaths ranged from 1–6 years (average, 3.2 years). Of these patients, one died at 4 years and there have been no recorded graft infections.

Discussion

Our results compare with others in terms of sample size and outcome, with no graft infections. Most series tend to include a large number of patients with dual pathologies that were treated separately and so the actual number of synchronous procedures is low.

Guidelines for treatment of dual pathologies have been reported by Velanovich and Anderson⁹ who concluded that if one was symptomatic then it should be resected first, a

view supported by Weinstein *et al.*⁷ Their study supported the role of simultaneous aortic and colorectal surgery if the aneurysm is > 5 cm and the tumour has a > 75–80% chance of obstruction or perforation, as long as the combined procedure had < 10% operative mortality and < 50% complication rate.

Reports of AAA repairs combined with synchronous gastrointestinal surgery are summarised in Table 2.

One of the alternatives to synchronous surgery is surgery for the gastrointestinal pathology alone. It has been reported that there is an increased risk of aneurysm rupture in these cases. In 1980, Swanson *et al.*⁶ reported 10 cases of aneurysm rupture following laparotomy, at a mean of 10 days postoperatively. Importantly, only one patient survived surgery for the ruptured aneurysm. A review considering the priority of surgery in patients with colorectal cancer and AAA by Robinson *et al.*¹¹ included a series of 1337 aneurysms. There were 2 synchronous aneurysm repairs and bowel resections, without evidence of graft infection. Of 10 patients with a large (> 6 cm) AAA who underwent bowel resection alone, there were early aneurysm ruptures in two (at 2 and 5 days postoperatively), supporting the view that separate surgical procedures can lead to early rupture. A more recent series,¹⁰ however, reported no early ruptures in 6 patients with aneurysms where colonic resections were performed first.

AAA and malignancy rarely present at the same time. Szilagyi *et al.*⁴ reported the frequency at 3.9%, with 31 cases of coincidental malignancy in 803 AAAs and only one case of synchronous surgery performed, without complication. A Japanese group have reported gastrointestinal cancers occurring in 8% of their 229 aneurysms,¹² with an uneventful postoperative recovery in the 5 operated on as synchronous procedures.

Table 2 Summary of papers reporting combined aortic and gastrointestinal surgery

Paper	Year	Number of AAAs	Number of combined AAA/GI procedures	Outcome as reported	Complications recorded	Evidence of graft infection?
Szilagyi <i>et al.</i> ⁴	1967	803	1	Well at 8 month follow-up		None
Bickerstaff <i>et al.</i> ⁸	1984	563	53			2 cases
Hugh <i>et al.</i> ¹⁴	1988	154	4	1 peri-operative death		None
Thomas <i>et al.</i> ¹³	1989	241	45	8% mortality versus 4% for AAA alone		None
Nora <i>et al.</i> ⁵	1989	3500	2	1 died of metastases at 1 year; 1 well at 18 months f/u		None
Brown & Kelly ¹⁶	1992	32	32	1 death	2 wound infections	None
Komori <i>et al.</i> ¹²	1993	229	5			None
Robinson <i>et al.</i> ¹¹	1994	1337	2	1 died 21 days of PE; 1 died of metastases at 18 months		None
Egeberg ¹⁰	1997	459	1	Died 3 years		None
Oshodi <i>et al.</i> ¹⁵	1999	9	9	2 deaths (both with colonic ischaemia)		None

The decision as to the priority for resection was reviewed by Nora *et al.*,⁵ looking at cases of colorectal cancer occurring with AAA. They performed two synchronous operations, neither of which suffered graft sepsis. They underlined the advantages of a combined approach, namely the elimination of risks of complications from an unresected lesion, the removal for the need for a second major operation in an elderly group with established cardiovascular disease and also the psychological benefit to the patient of having both potentially fatal pathologies treated.

Like the study of Szilagyi *et al.*, most reports of any numerical size are of two separate operations with few, if any, synchronous procedures. In one of the largest series, Bickerstaff *et al.*⁸ compared the mortality of the combined procedure with the separate approach. A higher mortality was noted in the combined surgery group (6% of 53 patients) when compared with aneurysm repair alone (2.6%), and a similarly higher morbidity rate (18.5% versus 12.8%). Although neither of these differences were statistically significant, they mirror the experience of Thomas,¹³ who reported a mortality rate of 8.9% compared with 4.6% for aneurysm repair alone.

Further evidence of the mortality of combined procedures has been presented by an Australian series¹⁴ comprising 158 aneurysms with the 4 synchronous procedures including one death from sepsis. Both Oshodi *et al.*¹⁵ and Brown and Kelly¹⁶ though, after reviewing a total of 85 cases of combined surgery, concluded that a simultaneous approach could prove to be the preferred course when faced with concurrent aortic and gastrointestinal pathology.

Clearly, from the numbers of patients in these series, firm conclusions are difficult to draw. A recurrent theme in the reports, however, is an absence of the marked rise in graft infections that might be expected. This closely reflects our own experience and seems to support our view that fear of graft infections alone is not a compelling argument to avoid performing combined surgery when other factors would support its consideration.

Conclusions

Aortic aneurysm is a common condition, but its co-existence with second intra-abdominal pathology is uncommon. When two pathologies are found, the decisions on which to resect first or whether to perform a joint procedure are currently left largely to the discretion and experience of the individual surgeon. Few series are available which quantify the risks precisely. We accept that the number of patients is relatively small, this series adds more weight to the

argument that although, in theory, there could be a considerably increased risk of graft infections with synchronous aneurysm and gastrointestinal tract operations, there is little objective evidence of an actual rise in infection rates to be found in the surgical literature.

On the basis of our experience and a literature review, it would appear that surgery for both pathologies simultaneously could be considered, where urgent treatment of both is indicated.

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