Value of "Second-Look Laparotomy" in Peritoneal Sepsis

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Background: Evaluation of the post-laparotomy patient, particularly if still on a ventilator, is difficult and assessment of resolution of sepsis controversial.
Methods: A retrospective study of all cases of severe peritonitis seen over a 14-year period in Bulawayo on one surgical firm from 1989 to 2003 was carried out. Patients studied included cases of sepsis *de novo* and septic complications of semi-elective or emergency abdominal surgery.
Results: Out of a total of 691 cases of generalized septic peritonitis seen between 1989 and 2003, 170 patients met the criteria and formed the basis of this study. Their ages ranged from 3 days to 90 years. Cases of severe generalized septic peritonitis in which the Acute Physiology and Chronic Health Evaluation (APACHE) II score was over 16 were analyzed. Fifty-four patients died within 48 hours of surgery. Thirty-nine patients survived after a second laparotomy; three of these had two re-laparotomies. There were 24 patients who underwent a second laparotomy, but succumbed nonetheless. Benefits of single or multiple laparotomies for intra-abdominal sepsis were computed where the predicted mortality was 20-30% (APACHE II 12-16) the actual mortality was reduced to zero; where the predicted mortality was 30-45% (APACHE II 16-20) the actual mortality came down to <10%; where the predicted mortality was 45-60% (APACHE II 20-25) the actual mortality dropped to <30% .

Introduction

Severe peritoneal sepsis is not uncommon in Africa. Although diagnosis and laparotomy are not usually problematic, postoperative management is. Evaluation of the post-laparotomy patient, particularly if still on a ventilator, is difficult and assessment of resolution of sepsis controversial. Planned relaparotomy has been advocated to allow for accurate visual assessment of the condition of the abdomen, to lavage further sepsis, to repair further visceral damage, and to discover any missed pathology.

Patients and Methods

A retrospective study of all cases of severe peritonitis seen over a 14-year period in Bulawayo on one surgical firm from 1989 to 2003 was carried out. Cases of severe generalized septic peritonitis were analyzed in which the Acute Physiology and Chronic Health Evaluation (APACHE) II score was over 16. This score computates predicted mortality according to temperature, mean blood pressure, pulse, respiratory rate, pO2 or PH, Na+, K+, Creatinine, Haematocrit, WBC, Glasgow Coma Scale, age, chronic health indices and emergency surgery. Patients included cases of sepsis *de novo* and septic complications of semi-elective or emergency abdominal surgery. Basic data on these cases was collated, particularly in respect of age and HIV status. Those who died within 48 hours of surgery were excluded from the study. Those who developed primary respiratory complications or anaesthetic complications resulting in death were separated from those who it was deemed may have benefited from a relaparotomy. The notes were analyzed whether this was a real possibility.

The results of those patients, who underwent a second-look laparotomy, either electively or as emergency, were compared with those who did not, and an analysis made whether a second laparotomy may have significantly altered the prognosis in the latter group. Further, analysis from the notes was made whether earlier relaparotomy could possibly have altered a fatal outcome.

Results

Out of a total of 691 cases of generalized septic peritonitis seen between 1989 and 2003, 170 patients met the criteria and formed the basis of this study. Their ages ranged from 3 days to 90

years. There were 111 males and 59 females. A total of 54 patients died within 48 hours of surgery. These were not further considered in the analysis. A further 53 patients died without undergoing relaparotomy; of these 26 had primary respiratory complications, not considered secondary to any abdominal pathology, or anaesthetic complications.

This left 27 whose death may have been avoidable by further laparotomy; scrutiny of the notes suggested that 11 patients could almost certainly have benefited from a second intervention (Table 2).

A total of 39 patients survived after a second laparotomy; three of these had two re-laparotomies. In other words, planned procedures, where a conscious elective decision was made to re-open the patient notwithstanding the current postoperative parameters were made in 14 patients. These were performed within 48 hours, and a further five within 72 hours; two were performed at four days, and one at five days postoperatively. In only one case was no significant pathology found. The remaining 25 second-look laparotomies were performed because the clinical signs or investigations dictated such necessity.

Table 1. Causes of sepsis Peritonitis

CAUSE	**NUMBER OF PATIENTS**
Appendicitis	52
Non-viable small bowel	29
Perforated small bowel	22
Primary peritonitis (inc. TB)	16
Perforated large bowel	14
Perforated stomach/duodenum	12
Non-viable large bowel	10
Colitis	8
Hepatic/Splenic/Subphrenic abscess	4
Non-viable small & large bowel	3
Complications from non-septic cases	
▪ Sigmoid colectomy	8
▪ Division small bowel adhesions	4
▪ Pancreatic pseudocystojejunostomy	2
▪ Cholecystectomy	1
▪ Gastrojejunostomy	1

Table 2. Possible second intervention.

Diagnosis	**Operation**	**Complication**	**Death**
F60 Pelvic Abscess	Rt hemicolectomy + Closure small bowel perforation.	Small bowel fistula +29	
F 1 Intussusception	Rt hemicolectomy	Septicaemia	+ 4
F41 Pelvic abscess	Appendicectomy; Hysterectomy	Faecal fistulae	+30
M16 Peritonitis	Ileocaecal resection	Faecal fistula	+19
M44 Pancreatic cyst	pancreatic pseudocystojejunostomy-en-Y	Biliary peritonitis + 4	
M40 Perforated DU	Oversew perforated DU	Peritonitis	+ 8
M33 Peritonitis	Appendicectomy	Septicaemia + 7	
M20 Peritonitis	Appendicectomy	Sepsis; Pleural effusion + 7	
M21 Peritonitis	Appendicectomy	Septicaemia + 3	
M43 Perforated DU	Oversew perforated DU	Peritonitis	+ 4
M39 Perforated DU	Oversew perforated DU	Septicaemia	+ 3

There were 24 patients who underwent a second laparotomy, but succumbed nonetheless. Three of these had two re-laparotomies. Only eight had the re-laparotomy performed within 5 days of the first procedure; obviously the remaining 18 should have had the second procedure done earlier. (In all cases significant life-threatening pathology was found). Scrutiny of the notes suggested that 13 cases may well have survived, had this been done. Of these, only four (nos. 6, 7, 11, 13) were initially operated upon by junior surgeons. No specific age-group fared worse than another and no specific causes of sepsis could be related to a greater risk of complications.

Discussion

Assessment of the postoperative abdomen is often difficult, and especially so in a ventilated, sedated patient. Symptoms (pain) and signs (abdominal distension & tenderness) may be non-specific, vital signs unimpaired, pyrexia absent, leucocyte count normal (especially in HIV disease), urine output satisfactory or fair, and ultrasonography unhelpful. There is therefore much possibly to be gained by a second look if suspicions are aroused when the postoperative patient is not making a straightforward recovery; this is especially so in cases where the first laparotomy has been performed for sepsis. The advantages have, however, to be shown to outweigh the trouble, cost, and risk of relaparotomy. Some have concluded that a "second-look" laparotomy should *not* be routine[1].

Which patients might therefore benefit? It is in an attempt to answer this question that this retrospective survey was performed.

Table 3.

Diagnosis/Complication	Operation/Relaparotomy	Interval
1. M42 Intra-abdominal abscess	Laparotomy & drainage	
Subphrenic abscess	Relaparotomy & drainage	+10
2. M32 Ruptured liver	Laparotomy & lavage	
Biliary peritonitis	Closure small bowel perforation	+16
3. M45 Sigmoid volvulus	Sigmoid colectomy	
Anastomotic leak	Hartmann's op; small bowel resection	+17
4. F15 Phytomycosis stomach	Polya gastrectomy; transverse colectomy	
Biliary peritonitis	Closure small bowel perforation	+10
5. M40 Adhesive intestinal obstruction	Laparotomy & lavage	
Biliary peritonitis	Relaparotomy & lavage	+10
6. M62 Adhesive intestinal obstruction	Appendicectomy & enterotomy	
Faecal fistula	Small bowel resection	+13
7. M29 Peritonitis	Appendicectomy	
Intra-abdominal sepsis	Relaparotomy & lavage	+10
8. M78 Peritonitis	Right hemicolectomy	
Anastomotic leak	Jejunocolic resection	+11
9. M48 Peritonitis	Appendicectomy	
Septicaemia; jaundice	Relaparotomy & lavage	+14
10. M59 Peritonitis	Appendicectomy	
Intra-abdominal sepsis	Relaparotomy & lavage	+ 7
11. F22 Pelvic abscess	Laparotomy & drainage	
Faecal fistula; peritonitis	Hartmann's operation	+ 8
12. M70 Strangulated RIH	RIH repair, small bowel resection	
Peritonitis	Small bowel resection	+11
13. M54 Appendicitis	Appendicectomy	
Pelvic abscess	Laparotomy & drainage	+ 8

The APACHE II scoring system gives a quantitative assessment of predicted mortality, and this was used (as much as it was possible to collate data from patients' notes) to define those patients with severe premorbid sepsis. A score of 16 gives a predicted mortality of 30%; because of inadequacy of data the actual added score for patients (if all parameters had been measured) was probably higher, and therefore their real predicted mortality higher still. Cases with a history suggesting abdominal sepsis for more than three days invariably had scores >12. Any intervention that consistently can be shown to reduce the mortality from these figures is therefore concluded to be beneficial.

Studies have computed the benefits of single or multiple laparotomies for intra-abdominal sepsis: where the predicted mortality was 20-30% (APACHE II 12-16) the actual mortality was reduced to zero; where the predicted mortality was 30-45% (APACHE II 16-20) the actual mortality came down to <10%; where the predicted mortality was 45-60% (APACHE II 20-25) the actual mortality dropped to <30% [2]. Above scores of 25, the benefits were not so clear.

It therefore seems reasonable to suggest, in our environment, where intensive support of critically ill patients may not be very feasible, that certainly those patients with APACHE II scores of 12-16, and probably also those with scores 16-20 deserve a second-look laparotomy. This is borne out by our study where mortality was reduced by 60% by relaparotomy. Such figures are, however, academic; in real terms, though, the advantages of relaparotomy are:

1. Lavage of residual sepsis
2. Revealing hidden or missed pathology
3. Correcting mistakes of a previous (inexperienced) surgeon.
4. Completing definitive surgery where initial damage-limitation laparotomy was done.

Further, especially but not exclusively in patients who are young and do not have HIV disease, the stress of a relaparotomy is probably insignificant. It does therefore seem to be true: nothing ventured, nothing gained, or: "Better to look and see, rather than wait and see."

References

1. Oliver, MJ. Generalised Peritonitis due to Appendicitis. Proc Assoc Surg E Afr 1987; **10**: 26-27.
2. Jiffry *et al.* Aust NZ J Surg 1998. **68**(2):139-