The Burden of The Open Abdomen: A Single-Centre Five-Year Audit

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BACKGROUND

- At the end of most laparotomies, the abdominal fascia can be closed. However, sometimes full fascial closure isn't possible and the operating surgeon is forced to leave the abdomen open.
- Associated with mortality rates of >30% (Boele et al 2009).
- It is an iatrogenic complication of modern surgery, resulting from advances in operative management of traumatic injuries, severe sepsis, and abdominal emergencies such as compartment syndrome.
- There are various differing temporary containment and protection of the abdominal viscera and approaches to definitive closure of both fascia and skin.
- Patients with an open abdomen that don't achieve definitive fascial closure (DFC) by the time of hospital discharge have prolonged worsened physical and mental wellbeing and are responsible for significant societal and healthcare costs (De Siqueira et al 2014).

METHOD

- Retrospective audit to review overall survival outcomes, DFC and the healthcare system costs associated with the open abdomen at Christchurch Hospital, Canterbury District Health Board (CDHB).
- All patients Jan 2014 – Dec 2019 with operation details with the keywords "open abdomen", "laparostomy", "relook", "VAC change".
- Approximate costings were sourced from the CDHB Planning and Funding department. Costs were broken down into three categories – bed occupancy, return to theatre (RTT) and VAC usage.
- Anaesthesia $10.79/min, Surgery $41.89/min with an additional one-off $572.58/visit, Recovery $7.59/min, and an entire operation overall additional one-off $40.16/visit. A minimum equipment cost per RRT e.g. swabs, sponges, saline, disposable gloves/gowns $115/visit.
- There is a one-off $495 per VAC machine. The minimum cost associated with each VAC change $78.71 (cannisters, adhesives). Daily hirage $40.
- Only in-hospital mortality was considered.

RESULTS

- 17 patients
- 10 male; median age 70 years (32-87)
- 7 female; median age 63 years (44-77)
- Main indication documented as abdominal compartment syndrome followed by non-specific planned relook
- Median ICU stay length – 8 days (1-57)
- Median total hospital stay length – 24 days (2-401)
- Mortality rate = 23.5%

RESULTS

- Median return to theatre – 2 (1-18)
- VAC was used on all occasions
- DFC within initial hospitalisation – 59%
- 12% (2/17) underwent delayed DFC
- 29% did not achieve DFC, 3 due to inpatient mortality
- Bed occupancy cost - $2,872,900
- RRT cost - $311,202
- VAC cost - $24,080
- **Total estimated minimum cost - $3,208,182**

Specific documented cause	Frequency
Ischaemic gut (with or without associated SMA/V thrombus)	6
Emergency open abdominal aortic aneurysm repairs	2
Complications of severe necrotising pancreatitis - Small bowel perforation - Ascitic drain into small bowel	2
Small bowel injury following elective abdominosacrolopexy	1
Post-operative bleeding following elective ultra-low anterior resection with coloanal anastomosis	1
Biliary sepsis following elective resection of root of small bowel mesentery liposarcoma	1
Small bowel resection required after iatrogenic injury during laparoscopic bilateral salpingoophorectomy	1
Severe life-threatening haematemesis related to aortoenteric D4 fistula	1
Pseudo-obstruction caecal perforation following acute CABG	1
Severe multi-trauma fall from 10m height	1

CONCLUSION

The open abdomen is a situation that is encountered increasingly frequently in trauma and emergency surgery, and is often the price to be paid for saving severely ill or injured patients. The primary goal of progressive reduction of the fascial defect is to achieve a definitive closure of open abdomen within the initial hospitalization. As authors we reviewed 17 patients over a 5-year period at the CDHB having a laparostomy performed as part of their hospital stay. Of those, 59% were able to achieve the epitomised DFC with a 23.5% mortality rate. The financial burden involved costed over $3million. The fundamentals of the open abdomen have a very real impact on limited resources such as ICU availability and equipment supply stocks.