ABSTRACTS

Primary Repair of Multiple Colonic Injuries Abstract of ChM Thesis 1998, University of Manchester

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This research has been undertaken in response to changes in opinion regarding the management of colonic penetrating injury. In the past decade, civilian trauma surgeons have reported clinical trials which have established that primary colonic repair has no greater mortality or morbidity rates than when colostomy is performed to exteriorise or defunction a colonic wound. Colostomy was established as the treatment of choice for colonic injury during World War II, as it reduced the risk of secondary faecal peritonitis as a result of colonic wound breakdown. Military surgeons have been reluctant to abandon a policy of colonic exteriorisation, arguing that war wounded may have established faecal peritonitis due to delay in reaching surgical support. Furthermore, they argue that battlefield wounds differ from the stabbings and gunshot wounds seen in civilian practice (small anti-personnel fragmenting munitions cause the majority of military wounds), and that military surgical facilities may be inferior to civilian units.

The purpose of this thesis was to investigate the suitability of definitive primary repair of multiple colonic injuries, in the presence of established faecal peritonitis.

A model of faecal peritonitis was developed in the adult pig by creating, at laparotomy, multiple perforating ballistic wounds of the colon, using anti-personnel fragment simulating projectiles. The colon was returned to the abdomen and colonic repair was performed at a second laparotomy, 6 hours after wounding. Colonic wounds were repaired using either a single layer of interrupted absorbable sutures (Lembert's technique), or stainless steel skin staples in lieu of sutures, in a method developed and described in this thesis. Colonic wound healing was assessed clinically over a period of up to 14 days, and at post mortem by biomechanical and histological examination.

In a related study using the soft tissue simulant, 20% gelatin, retrocolic wound tracks were examined to quantify the degree of trauma and bacterial contamination produced by anti-personnel fragment simulating projectiles.

The healing of 304 colonic wounds in 26 pigs was assessed. Stapled ($n=152$) repair was significantly quicker than sutured ($n=152$) repair (mean $\pm$ S.D. time to complete 6 repairs; stapled 5.0 ± 2.1 mins; sutured 29.4 ± 4.6 mins; $p=0$, ANOVA). There were 2 premature deaths due to sepsis. There were 4 major complications found at post mortem examination at 14 days; 3 superficial wound abscesses and a 1cm pericolic abscess involving a healed stapled colonic wound. All repairs withstood intraluminal pressures in excess of physiological levels. There was no significant difference in the initial leak pressures of repairs using the 2 methods, however, histological examination showed stapled repairs healed more rapidly than sutured repairs.

Bacteriological analysis of wound tracks produced in gelatin showed contamination to be lower than that required to progress to wound infection (10^5 CFUg⁻¹), and that bacterial contamination decreased along the wound track.

This study supports the use of definitive primary repair of colonic wounds in the presence of faecal peritonitis. The use of skin staples to close colonic wounds may result in a reduction in operating time compared to the use of traditional suture methods. Moreover, healing following stapled repairs is superior to Lembert's sutured method, both biomechanically and histologically. Debridement of retrocolic wounds caused by modern anti-personnel fragments is not recommended, as these wound tracks have a low risk of developing infection, and such a procedure increases local tissue injury and the risk of adjacent colonic wound dehiscence.

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