Case Report

Accidental Impalement Injuries of the Intraperitoneal Rectum caused by the Barrel of the Self Loading Rifle

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SUMMARY: Rectal impalement injuries are uncommon. Two cases are described of soldiers who suffered similar injuries due to accidental impalement on the barrel of a self-loading rifle.

Rectal injuries are the most serious of those which involve the large bowel. Only 10-15 years ago the mortality ranged from 30 to 60%, though more recent reports have substantially improved on these figures

Impalement of the ano-rectum is unusual and accounts for very few of the causes of rectal injury. I report two similar cases of accidental impalement in soldiers on the barrel of the self-loading rifle.

Case A
Signalman S, aged 19 was admitted to hospital in July 1980. Whilst training to carry out an anti-ambush drill he jumped off the back of an Army 4 ton lorry and impaled himself on the barrel of the SLR (self loading rifle) of another soldier who was crouched on the ground with his weapon vertical. The victim was disimpaled by colleagues at the scene of the accident and a penetrating length of 20 cms was estimated. The barrel of the weapon was described as faeculent with 'flesh' attached to the end.

On examination he had a tachycardia of 120 per minute with normal blood pressure. He complained of lower abdominal pain and had signs of lower abdominal peritonitis. Examination of the perineum revealed an abrasion at the anal margin and rectal examination showed the presence of fresh blood and faeces.

A diagnosis of intraperitoneal rectal perforation was made and after resuscitation with intravenous fluids and antibiotics, he underwent examination under anaesthesia. This confirmed a perforation of the anterior wall of the rectum above the prostate. A urinary catheter was passed which drained blood stained urine. A catheter was inserted which drained blood-stained urine. At laparotomy the peritoneum was found to contain blood and faeces. The barrel of the rifle had pierced the recto-vesical septum, abraded the left seminal vesicle and in addition had penetrated the sigmoid mesentery which was freely bleeding.

The rectum was mobilised and the perforation closed, with chronic catgut. The left seminal vesicle and vas deferens were intact. A left iliac sigmoid loop colostomy was fashioned over a rod, proximal loop lowermost, utilizing the defect in the sigmoid mesentery. After peritoneal lavage the abdomen was closed with extraperitoneal pelvic suction drainage.

He made an uneventful recovery and six weeks later the colostomy was closed. Eight days afterwards he developed a local wound infection followed by a faecal fistula which subsequently healed spontaneously and in March 1985 he returned to his unit.

Case B
Private McG aged 19 was admitted to hospital in October 1984. Whilst on patrol in the border area of Northern Ireland he attempted to climb over a fence. He leant his SLR vertically against the fence and as he climbed up, the fence collapsed. In the fall he straddled the barrel of his weapon and impaled himself. He removed the weapon and subsequently defaecated passing blood and faeces.

Examination revealed the same findings as in Case A with signs of lower abdominal peritonitis, a small perianal abrasion, intact sphincter ani and a rectum full of blood and faeces. After resuscitation and antibiotics he underwent examination under anaesthesia and laparotomy. Digital examination demonstrated a tear in the anterior wall of the rectum above the prostate behind the bladder. Faeces were removed manually and a catheter inserted which drained blood-stained urine. At laparotomy the peritoneum was found to contain blood and faeces. The barrel of the rifle had pierced the recto-vesical septum, abraded the left seminal vesicle and in addition had penetrated the sigmoid mesentery which was freely bleeding (Fig 1).

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Discussion

The commonest causes of rectal injury are stab wounds, gunshot wounds and road traffic accidents. Less common causes are iatrogenic (sigmoidoscopy and biopsy, colonoscopy and biopsy, Barium enema, laceration during operative procedure, irradiation and self induced (ano-erotic stimulation by enemata, foreign bodies etc). Impalement injuries are uncommon in most series reporting large bowel trauma and in these reports the mechanism of injury is often not described. Usually the cause is a fall, with the body playing the active role and the impaling object the passive role and the extent of the injury depends upon the height from which the body falls and the shape and dimensions of the impaling object. Sharp objects will impale at the site of contact in the perineum whereas blunt objects as in these two cases will be directed by the buttocks and sacrum to the apex of the perineum in the natal cleft and damage the ano-rectum and urogenital tract.

Untreated, rectal impalement injuries are lethal, a fact appreciated by the Ancient Chinese who used impalement as a method of executing criminals. King Edward II of England was murdered by impalement, a method selected because it left no external marks. There is only one contemporary report of murder by impalement in the literature, the victim a mental hospital inmate. He had been the passive partner in homosexual practices and he was killed by multiple impalements with a sharpened broom handle. At necropsy one track was found to extend from the anococcygeal raphe through the liver to the diaphragm. The vast majority of impalement injuries are accidental.

A recent report described the injury and management of a surviving patient who impaled herself from ano-rectum to right nipple on a tree branch after jumping from a burning building. In 1982 a fall from scaffolding resulted in impalement of the victim on a large steel girder. Though the penetration did not reach the peritoneum the injured man had to be anaesthetised at the scene of the accident and transported to hospital by ambulance with the doors open at the back to accommodate the girder. Subsequent removal of the girder required the strength of two men.

The most harrowing case report of rectal impalement which will of be more than cursory interest to many readers was published in 1984. It was subtitled 'An Unrecognised Hazard for Surgeons' and occurred in the operating theatre during a neurosurgical procedure. A junior surgeon, assisting at the time, impaled himself on the central steel shaft of a swivel type stool, the seat of which had fallen off as the height was being adjusted.

Children have been the subject of several reports of impalement trauma suffering injuries due to high jump bars, cricket stumps, chair legs and pogo sticks. In 1976 an outbreak of peritonitis in a nursery was traced to the habit of one of the nurses placing rectal thermometers high in the rectums of the babies and thus technically impaling them.

I could find no previous report of impalement injury on the barrel of a rifle in the literature which is perhaps surprising given the overall activities of servicemen during training, exercises and on active service when they are inseparable from their personal weapons.

In the two cases described, the wound tracks were exactly similar with a perianal abrasion, entry through the anal sphincter into the ano-rectum, exit from the rectum anteriorly above the prostate, through the fascia of Denonvillier, skirting the posterior aspect of the bladder and seminal vesicles and into the pelvis. In both cases it is likely that the firm prostate protected the lower rectum, the anterior point of least resistance being just above where the anterior rectal wall is supported by the recto-vesical septum. In neither case was there serious injury to the bladder or small bowel though the absence of the former may be due to both bladders being empty at the time of injury though this cannot be substantiated.

In the second case the barrel had perforated the sigmoid mesentery which became a source of considerable bleeding. The management of these injuries is really a matter of adherence to surgical principles with repair of the perineum, repair of the rectum, peritoneal toilet and faecal diversion after adequate resuscitation and antibiotics. Drainage of the area should be adequate.

It is important to keep the rectal mobilisation to the minimum necessary to effect the repair in order not to damage the nervi erigentes. Many authors stress the importance of cleansing the distal segment of bowels per-operatively.

Several authors suggest that a colostomy is unnecessary in selected cases of left sided large bowel colo-rectal injury, depending on such factors as the degree of contamination, the size and cause of the perforation, the security of repair and the colonic faecal load. However, most agree that faecal diversion is necessary in rectal injuries. This entails a further major operative procedure to re-establish intestinal continuity which carries a high morbidity. In Case B a faecal fistula followed the colostomy closure which,
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Fortunately, closed spontaneously over a period of six weeks.

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