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Injuries of the colon may occur from a variety of mechanisms. Automobiles, guns, and knives are common etiologic agents. Injuries so produced usually occur in a normal colon filled with faeces. Such injuries are ordinarily lethal unless properly treated. The proper treatment of a traumatically injured colon has been the subject of considerable controversy. The traditional approach of exteriorization of the injured segment of colon continues to be advocated by many surgeons, whereas others advocate primary closure of the injury in selected cases. Whatever method is utilized it should be remembered that death from the colon injury per se can almost always be avoided if the injury is treated in timely and proper fashion.

In addition to external trauma, the colon may be injured during various diagnostic and therapeutic procedures. Perforation during procto-sigmoidoscopy and colonoscopy with or without a concomitant polypectomy as well as perforations during barium enema, dilatation and curettage in females have all been reported. Although certain authors have argued for an individualized approach to each of these types of injury, others believe a standard approach should be used for all.
Wounds of the colon resulting from penetrating trauma are commonly encountered at hospitals throughout the country. Prior to World War II this type of injury was associated with significant mortality and morbidity. Since then important work has been done in this area and characteristics of anastomotic healing have been firmly established. Today these wounds should be viewed as a serious event, but one that can be easily and safely managed provided sound surgical principles are adhered to and the surgeon is aware of the preferred therapy for the specific injury pattern present.

The epidemiologic characteristics of colon injury patients confirm to other groups of trauma victims since most are young males injured in or near their place of residence. In urban environment the majority result either from gunshot or stab wound. Blunt trauma including motor vehicle, alheletic or iatrogenic accidents, occur less frequently. However, in rural community the ratio between blunt and penetrating trauma is likely to be reversed.

The colonic injury can either be solitary or multiple. Most solitary colon injuries result from a stab wound and they tend to be randomly distributed throughout the colon. The gunshot wounds commonly produce injuries to multiple site within
the colon as well as damage to other organs within peritoneal cavity. High velocity weapons cause massive destruction of internal organs and surrounding tissues. Low velocity bullets cause less damage on entering the body. They often lodge in the tissues and thus there may not be an exit wound. Bombs explosions may have a devastating effect on the abdominal wall and intra-abdominal organs.

The colon is commonly injured by penetrating abdominal trauma. In most contemporary series, the infectious morbidity rate ranges from 25 to 35 percent and the mortality rate range from 3 to 5 percent. Most of the infectious morbidity following abdominal injury occurs as a consequence of delayed diagnosis or inadequate therapy for colon injuries.

The colon is at particular risk of infection. Because of the bacterial content of the colon a relatively minor leakage of faeces in the peritoneal cavity may result in a large inoculum of pathogenic bacteria. Furthermore, breakdown of the colonic suture line is more common than that seen with other hollow viscus injuries. Hawley and associates have shown experimentally that there is a greater concentration of collagenase in the colon than elsewhere in the bowel. Cronin and Co-workers demonstrated a greater increase in collagenolytic activity in the colonic wall after injuries than after colonic anastomosis. Penicillinase and penicillamine are
produced in variable concentrations by the colonic bacteria and could contribute to the weakening of cross-linking of collagen, which is necessary for the healing of anastomoses.

It is generally agreed that early recognition of colon injuries is crucial in diminishing infectious morbidity and mortality. A recent report has shown no mortality and an eleven (11%) percent infection rate in colon wounds diagnosed and treated within 2 hours of injuries. In addition to early recognition and treatment, the early administration of prophylactic antibiotics is beneficial in minimizing infectious morbidity and mortality.

Patients with perforating wounds of the colon present a special challenge to the clinical judgement of the surgeon. Excessive morbidity is caused by disruption of the suture line in the intestine, abdominal abscess, wound infection, unnecessary colostomy and repeated hospitalisation. These untoward consequences of trauma to the colon can be reduced by careful assessment and individualised therapy for each patient.

Experience gained during military conflicts resulted in substantial improvements in the morbidity and mortality of colonic wounds. During world war I, primary closure of the colon injury resulted in 60 percent
mortality. During world war II the routine use of exteriorisation drastically reduced the mortality of colonic wounds. The continued use of exteriorisation and the improvement in method of triage and transportation, surgical intervention and widespread use of antibiotics further reduced the mortality of colon wounds to 15% during Korean war and to 12% during the Vietnam conflict.

Though Imes suggested primary repair of injuries to the colon as early as 1945, widespread use of colostomy was prevailing method in most civilian centres. Primary closure was not advocated on a large scale until 1970, when Se all and associates reported a series of primary repairs of the colon with results comparable to colostomy. The technique had the advantage of obviating secondary and tertiary procedures. Most recently treatment of the injured colon by exteriorized primary repair with early "interiorization" during the same hospitalization has been suggested. These two approaches, primary closure and exteriorized closure, have lead to abandonment of dogmatic approach of 'colostomy only' as the only acceptable method of management of colonic injuries.

Controversy still abounds in the management of civilian colonic injuries. Primary repair, exteriorisation and colostomy have all been advocated as the primary modality of treatment in managing wounds of the colon.
To complicate matters further, the type and magnitude of associated injuries also play significant role in the outcome of the repair and must be taken into consideration when selecting the modality of repair. Primary repair of the colon can be risky and ill advised in many situations whereas colostomy may be unnecessary in other circumstances. In addition although colostomy may be safe initially, it is attendant with a larger hospital stay and other risks at the time of closure.

Recent practice for management of colon injuries which has tended to incorporate principles gleaned from military experiences includes.

1. PRIMARY SUTURE OR STAPLE CLOSURE:

This technique is utilized primarily for right colon injuries and for relatively clean wounds of the left colon.

2. EXTERIORIZATION AND/OR PROXIMAL COLOSTOMY:

If the injury has occurred in mobile portion of the colon, it is exteriorized as a colostomy. Otherwise the injury is repaired by suture and a proximal diverting colostomy is performed.

3. EXTERIORIZED PRIMARY REPAIR:

The injured colon is sutured closed and the injury is exteriorized as an unopened colostomy. After 3 to 10 days the injured colon is replaced into the abdomen. If the repair breaks down, the exteriorized
colon functions as colostomy. This technique has fervent advocates but it is not recommended with any enthusiasm.

4. PRIMARY RESECTION WITH ANASTOMOSIS:

Extensive lesions of the right colon and occasional injuries of the left colon may be managed by resection and anastomosis.

In a military setting, heavy reliance on proximal colostomy or exteriorization is appropriate, but in recent years it has been recognised that civilian trauma to the colon may be managed in more selective manner, which includes primary suture.

Till recently the management of colon injuries was either exteriorisation of injured colon or repair of colonic injury plus proximal colostomy. It was repeatedly observed that a tear in small intestine when sutured healed nicely primarily but if the tear in the colon was closed primarily without proximal colostomy the tear did not heal properly and incidence of leakage through the sutured tear was very high.

The reasons were thought to be as follows:

1. Poor blood supply of colon as compared to small intestine.

2. Heavy bacterial content in colon which caused lot of gas formation, resulting in leakage through sutured tear.
3. Another very important reason was closed loop
construction of colon.

Colon is a closed loop, ileocaecal valve at
the proximal and anal canal with its double sphincters
at the distal end acting as air tight valves not allowing
even gas to pass out of colon involuntarily. Thus after
closure of colonic tears when there is gas formation in-
side colon, due to heavy bacteriological content, this gas
does not escape outside colon and it escapes through
sutured tear causing a leak. The proximal colostomy was
used as it acted as safety valve allowing gas to escape,
thus allowing healing of tear to occur.

But recently due to many advances in management
primary repair of colonic tears is being undertaken with-
out proximal colostomy or exteriorization successfully.
The recent introduction of combination of antibiotics-
Ampicillin for Gram positive bacteria, Gentamycin for
Gram negative bacteria and Metronidazole for anaerobic
bacteria, reduces bacterial flora of colon effectively.
Although given parenterally these antibiotics reach the
colon through enterogenous secretion in intestinal juices
and sterilise the colon. The escape of gas is facilitated
either by anal dilatation at the time of operation, making
the anal sphincter incompetent or still better by passing
flatus tube into the rectum through anal canal and suturing
it to perianal area and leaving it there for one week, so
that any gas formed into colon or rectum can come out
through the tube and does not distend the colon. If
the tear is in descending or sigmoid colon, a further
safety step is taken by passing a long Ryle's tube from
anal canal past the sutured colonic tear into descending
or sigmoid colon and irrigating the colon with injection
Kanamycin and metronidazole twice daily. This not
only further, reduces bacterial content of the colon but
also allows any gas formed to escape through the tube.
The tube is left for one week in the colon.

This management is being used at present to
tackle all injuries to colon.