DISCUSSION
The present study was conducted on fourteen patients of penetrating colonic injury who were admitted in Maharani Laxmi Bai Medical College & Hospital, Jhansi (U.P.) India and were treated by primary repair.

It is generally believed that right and left colonic injuries should be treated differently. Most authors suggest that primary repair or resection and anastomosis is safe in the majority of right colon civilian injuries, while they have strict criteria for primary repair in the left colon. Some authors even recommended routine colostomy in all left colon injuries. This approach to the injured colon is based on theoretical grounds rather than on clinical evidence; however, there is no clinical evidence to show that right and left colonic injuries behave differently. Thompson et al found the same morbidity in right and left colonic injuries in two similar groups with respect to various complication risk factors. Dang et al and Bartzial et al reported similar results. In the present study injuries of the right colon had a similar morbidity as the left colon. Injuries of the right colon treated by primary repair had the same morbidity as the ones in the left colon treated similarly.

(34)
Most authors recommended primary repair of the colonic injuries, especially the left, only under strict criteria: minimal tissue damage, minimal faecal contamination, less than two associated intra-abdominal injuries, and no shock on admission. Shock on admission is generally considered a contra-indication to primary repair, especially in left colon injuries. The findings of present study do not support this view; the incidence of colon related complications in shock and normotensive patients was same irrespective of location of injury and modality of treatment. Similar results were reported by Shannon et al.

Most authors advise against primary repair, especially in the left colon in the presence of more than two associated intra-abdominal injuries. Our findings do not support this; the presence of associated intra-abdominal injuries was not associated with higher incidence of colon related abdominal complications irrespective of the modality of treatment.

It seems that the most important risk factor for the development of abdominal complications is the gross contamination at the time of operation. In our opinion under such circumstances a colostomy should be performed irrespective of right or left sided location of the injury. Some authors suggest that primary repair
or anastomosis can safely be performed in right colon injuries, even at the presence of gross contamination. The findings in the present study do not support this view.

Our incidence of wound sepsis was low (14.28%) despite the fact that we routinely performed primary closure of the skin and subcutaneous tissue. This compares favourably with other series where the wound was left open. Our low infection rate was probably due to the pre-operative administration of antibiotics and the washing of the wound with normal saline, Metronidazole and Betadine before closing the abdomen.

Generally colostomy is considered as the safest method of treatment of colonic injury. Although this may be true for certain injuries where suture line leak is likely, we believe that colostomy has been over used. A colostomy is an open source of contamination very close to an incision and with a possible communication with the abdominal cavity through its abdominal wall exit. Theoretically it should be associated with a higher incidence of wound sepsis and intra-peritoneal abscesses. Further more it is associated with longer hospital stay than after primary repair and the patients have to be subjected to the inconvenience and risks of another operation for colostomy closure, a procedure with significant morbidity. We believe that the clinical significance of the different anatomy, physiology and bacteriology of right and left colon has been over emphasized.

Our findings suggest that both sides of the colon behave similarly after injury. In most cases
primary repair could safely be performed in both right and left colons. Indications for colostomy should be gross peritoneal contamination, major colonic injuries, and the presence of a large amount of hard faeces. The presence of shock on admission and multiple associated injuries should not be contra-indications for primary repair.

Previously it was seen that in 1943 (II world war) the lesson learned was that primary repair of colonic injuries was associated with the high degree of leakage. The reasons thought to be responsible, for this were (1) Poor blood supply of colon, compared to small intestine. (2) High bacterial content of colon.

A very significant factor which can be added in retrospect to this is closed loop characteristic of colon. At the proximal end, a competent ileocaecal valve does not allow even air to pass from colon to terminal ileum. At the distal end, anal canal is tightly closed by two sphincters (internal and external) and normally does not allow even air to pass. The high bacterial content of colon causes fermentation of colonic contents with gas formation. This gas can neither pass in ileum nor outside thus causing distension of colon and leaking through the anastomosis. Therefore previously colostomy was advised after primary suture of injured area of colon so that the gas formed in the colon could come out through colostomy and could not damage the suture line. The success of primary closure of colonic injuries
attributed to successful management of this problem. The bacterial content of the colon was reduced in two ways.

1. By giving parenteral antibiotics—Ampicillin for Gram positive, Gentamycin for Gram-negative and Metronidazole for anaerobic bacteria. Due to internal enteric circulation, all these antibacterial drugs reach in enteric and colonic secretions also and sterilize the gut.

2. By direct instillation of antibiotics—Kanamycin and Metronidazole into the colon by passing a long Ryle’s tube through anus into the colon. If injury was on left side of colon, this tube was passed and guided proximal to colonic anastomosis and fixed to perianal region. Even if injury was on right side this tube was passed as high into colon as possible and fixed to perianal area and kept there for one week. Instillation of Inj. Kanamycin half gram and Metronidazole 250 mg was done twice a day after raising the foot end of bed for half an hour so that these antibacterials could reach and be retained as high as possible in the colon. This markedly diminished bacterial content of colon and thus gas formation.

The closed loop character of the colon was disrupted and instant passage of flatus and faeces was
assured by passing a thick-bore flatus tube through the anal canal into rectum and fixing it to perianal area. This tube was left for one week into the rectum, so that any gas and faecal matter formed inside colon could immediately come out through this tube and thus not distend the colon and disrupt the anastomoses. We believe that this triple management has been responsible for very low incidence of leakage in our series, which was till now the vane of primary colonic suture.