Material
&
Methods
MATERIAL & METHODS

The study was conducted on patients presenting with signs and symptoms suggestive of any non-acute intestinal pathology in the out-patient department of MLB Medical College, Jhansi in the Department of Surgery over the past one year.

The conditions included among the heading of Non-acute Intestinal Pathologies were –

1. Sub-acute intestinal obstruction due to bands, strictures or adhesions (TB)
2. Recurrent appendicitis
3. Rectal prolapse
4. Carcinoma colon involving either ascending, transverse or descending colon or sigmoid colon
5. Appendicular lump
6. Ileo-caecal tuberculosis

Detailed history was taken, symptomatic assessment, signs were elicited and a probable pre-operative diagnosis was made. The pre-operative diagnosis was fortified with appropriate laboratory and radiographic investigations.

Apart from specific investigations, routine investigational work-up was done which included -

a. Evaluation of other medical problems – Blood sugar
b. Evaluation of cardiac and respiratory systems – ECG and Chest X-ray if needed
c. Normalization of fluids and electrolytes
d. Antibiotics
e. Evaluation of the genitourinary system – Urine routine & microscopic, blood urea, serum creatinine
f. Appropriate laboratory and radiographic studies, Complete hemogram (Hb, TLC, DLC, ESR)
X-ray abdomen erect view with both domes of diaphragm
USG whole abdomen
Barium meal follow through & Barium enema

Later the patient included in the study were divided into 2 categories -

II – Those subjected to open surgical procedures.

AIM OF STUDY

The basic aim of the conducted study over the last year was to compare and analyse the results of patients under group I with those of group II in terms of -

a  Feasibility
b  Alternative feasibility of assisted laparoscopic intervention
c  Operative time
d  Post operative pain relief
e  Discharge time
f  Return to work time
g  Complications

INSTRUMENTATION

Instruments used -

1  Insufflations and Optical Instruments
   a) Veress Needle Used for initial creation of the pneumoperitoneum
   b) Trocars & Cannula  5-6 mm (small) or 10-12 mm (large)
   c) Laparoscopes  10mm and 5 mm diameter – 30º view
(d) Video system  It comprises of

(i) Camera  Attaches over the laparoscope eye piece, single or triple CCD chip > 500 cms

(ii) Light Source  High intensity cold light source such as xenon or a halide

(iii) Light cable  Consists of fine optical fibres or jelly which carry light from source to laparoscope

(iv) Television Monitors  High resolution monitor usually 600 times of horizontal resolution, should be compatible with the camera

(e) Insufflator  The insufflator is a machine which pumps the gas into the peritoneal cavity for insufflation. For laparoscopic surgery the intraperitoneal pressure should be between 10-14 mm Hg which represents a volume of 2.5-4 litre in the relaxed peritoneal cavity

2 Hand Instruments

(a) Coagulating and Cutting Instruments

(i) Diathermy hook (with or without irrigation port)
This hook and allows tissues to be hooked and lifted away from the surrounding tissue before being cauterized.

(ii) Diathermy spatula

(iii) Diathermy bulb/bottom probe  for deep contact or spray coagulation

(b) Scissors  Scissors are used for precise cuttings

(i) Metzanbaum

(ii) Hooked scissors

(iii) Plain scissors

(iv) Micro scissors
(c) Holding/grasping forceps

(d) Needle holders

(e) Dissecting instrument  As pettilin forceps are the modifications of holding grasping forceps

(f) Suction/irrigation devices  irrigation fluid is heparinized solution

(g) Clips and clip applicators  Clips are small (3 mm), medium large (4-5mm), large (6-7 mm), extra large (9-10 mm) Clip applicators are usually 10 mm in diameter

3 Sterilization of the Instruments

Before use, the instruments are washed in soap and water and then the fibre-optic light cables and instruments are soaked in an antiseptic solution such as 2% aqueous glutaraldehyde (gidex)

After sterilization all instruments should be washed with sterile saline, as the sterilizing solution is irritant to the peritoneal cavity

Anaesthesia – General

Statistical Analysis –

After observation and results were derived from the study conducted during last one year, the results were subjected to proper statistical analysis thereby drawing conclusions from the study
Diagram showing the placement of trocars and their sizes in case of Sub Acute Intestinal Obstruction (due to adhesions, bands).
OPERATIVE TECHNIQUES IN VARIOUS LAPAROSCOPIC PROCEDURES

1. Management of Adhesions

Creation of pneumoperitoneum and introduction of trocar

Patient is positioned supine on the table

The Veress needle is used to create the pneumoperitoneum in all cases
The V-needle is usually inserted in the left hypochondrium since this is the area of
the abdomen where one is likely to find fewer adhesions because of the lower
frequency of inflammatory processes at this level(19) Alternatively open method
of introduction of Hasson’s Trocar is carried out

Perforations are often associated with blind insertion of the initial trocar
rather than with the Veress needle itself

Once the trocar and the scope are inserted, in the left hypochondrium
attempt is made to perform blunt dissection with the tip of the laparoscope if
parietal adhesions are seen If this was not possible, then introduction of a finger
in the hole in order to separate adhesions from this area was carried out followed
by laparoscopic dissection

Later a 10 mm port was inserted in the left iliac fossa and a 5 mm third
port (either suprapubic or left hypochondrium) was placed Through them
atraumatic bowel graspers were put into abdomen for adhesiolysis Harmonic
scalpel was used for sharp dissection of the dense adhesions Finally the
hemostasis was secured with its help

All the ports were withdrawn and peritoneal cavity decompressed and
trocars sites were stitched with chromic catgut

2. OPERATIVE TECHNIQUE FOR LAPAROSCOPIC RIGHT
HEMICOLECTOMY

Patient is placed supine in position, pneumoperitoneum is created using a
standard technique for insufflation with a Veress needle and maintained at 12-15
mm Hg by an automatic CO2 insufflator.

A 10mm 30° telescope is inserted through supraumbilical port

Total 5 ports are used in the procedure

Supraumbilical – 10mm port (as initial camera port)
LAPAROSCOPIC ASSISTED (R) HEMICOLECTOMY

Diagram showing the placement of trocars and their sizes in case of right hemicolectomy for ileocaecal tuberculosis.
Left iliac fossa – 10 mm port
Suprapubic – 5 mm port
Left hypochondrium – 5 mm port
Epigastrum – 10 mm port (as later camera port)

Specific instruments used were – two Alligator bowel grasping instruments

Harmonic scalpel was utilized for all the sharp dissection and maintaining hemostasis within the abdominal cavity

The sequence of events in performing laparoscopic colon surgery is retraction of the bowel, mobilization, division of the mesenteric vessels, division of the bowel extracorporeally and extracorporeal anastomosis of the bowel ends

Retraction of the right side of the colon is achieved by grasping the bowel with Alligator bowel grasping instruments

Caecal mobilization is done with dissection of lateral peritoneal fold with the help of harmonic scalpel. Mobilization is performed along the right paracolic gutter by moving towards the hepatic flexure. Identification of vital structures such as ureter and duodenum is done

After this, an 2-3” incision is placed transversely midway between right subcostal margin and anterior superior iliac spine. The mobilized caecum, ascending colon and hepatic flexure are delivered out. After ligation and division of mesentery, bowel is resected and extracorporeal anastomosis is done with Monocryl 3-0. After securing hemostasis, bowel is put back in abdomen and incision closed. After all the ports were withdrawn, peritoneal cavity was decompressed and the trocar sites were stitched with chromic catgut.

3. Operative Procedure in Case of Laparoscopic Rectopexy

Patient is placed supine on the table with head-down tilt. A urinary catheter is passed to deflate the bladder

Pneumoperitoneum is created using a Veress needle with pressure maintained at 10-12 mm of Hg by an automatic CO2 insufflator

4 ports are used –

10mm supraumbilical – for the camera
10mm in right iliac fossa
Diagram showing the placement of trocars and their sizes used in Laparoscopic Rectopexy.
10mm in epigastrium

5mm in left hypochondrium

Initially the patient is placed in a steep Trendelenberg position allowing the small bowel loops to drop into peritoneal cavity

A laparoscopic Babcock is passed through the right iliac fossa port to hold the rectosigmoid junction to the right and with the help of harmonic scalpel peritoneal reflection on the right side of the rectosigmoid junction is dissected. By careful dissection the avascular plane between fascial capsule of the rectum anteriorly and the fascia of Waldeyer posteriorly is dissected under direct vision

The dissection was kept close to the rectum and posteriorly the roots, trunks and branches of the presacral nerve were identified and preserved. The left ureter was isolated as a precaution against inadvertent injury

After mobilization of the rectum down to the pelvic floor, a strip of polypropylene mesh 6”x6” is introduced into the abdomen through RIF 10 mm port for placement in the presacral space

The endoscopic stapler is then introduced through the umbilical port and the mesh is initially stapled to sacrococcygeal area. On average 3-4 staples are inserted cephaled to the initial staple to fix the mesh to the sacrum and presacral fascia. After fixation of the mesh, the rectum is held on light tension using the laparoscopic Babcock forceps and the right limb of the mesh is sutured / stapled to the serosa of the rectum

The rectum is then retracted to the right, and the left limb of the mesh brought around the rectum and secured to the rectal wall in a similar fashion at the upper and lower mesh edges. Care is taken not to encircle the rectum more than 2/3 circumferentially

The stapler is used to re-approximate the peritoneal edges before the operation is completed. The laparoscopic ports are then removed, followed by closure of the fascial defects with interrupted sutures
Diagram showing the sites of trocar placement and their sizes used in laparoscopic appendectomy.
4. Operative Technique in Laparoscopic Appendectomy

Patient is placed supine on the table and an indwelling urinary catheter is placed into the urinary bladder.

Pneumoperitoneum is created using a Veress needle.

Later a 10 mm port is advanced into abdominal cavity through supraumbilical incision, through which 30° laparoscope is introduced.

A second 10 mm port is inserted in the left iliac fossa – through which an atraumatic grasping forceps is inserted to displace the omentum and the caecum and to expose the appendix.

Finally a third port is placed midway between umbilicus and pubic symphysis.

Any adhesions encountered around the appendix or caecum are divided with the help of harmonic scalpel.

Appendicular mesentry is also taken care of with the help of harmonic scalpel and then metal clips are applied at the base of appendix. Then appendix is cut with the help of scissors and the specimen is retrieved through 10 mm port in left iliac fossa.

Hemostasis is secured in the abdominal cavity and then peritoneal cavity is decompressed. Port sites are closed with chromic catgut.