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A STUDY OF CONTINUOUS POSITIVE SUCTION DISSECTION : A NOVEL TECHNIQUE OF INTER BOWEL ADHESIOLYSIS

General Surgery

Dr. Nehalkumar Sisodiya M. S., Assistant Professor, Department of General Surgery, GCS Medical College, Ahmedabad.

Dr. Ankitkumar Bagdai* M. S., Assistant Professor, Department of General Surgery, GCS Medical College, Ahmedabad. *Corresponding Author

ABSTRACT

The purpose of this study was to access the intra operative easiness, usefulness and the role of suction dissection as a method of adhesiolysis in preventing intra operative bowel perforation. In this technique, we used Yankaeur's multiple hole suction cannula for adhesiolysis. This method is also useful for creation of precise anatomical planes in adhered tissues. Fifty patients were treated for adhesiolysis by this method. This method demonstrated extreme ease in use, shorter intra operative duration and minimal occurrence of iatrogenic bowel perforation as compared to other methods, also it is simple, inexpensive, precise, less traumatic and without any use of external agent.

KEYWORDS

Adhesiolysis, Suction dissection,Yankaeur's Cannula, Anatomical Plane.

INTRODUCTION

Adhesions are defined as connections between opposing serosal and/or nonserosal surfaces of the internal organs and the abdominal wall, at sites where there should be no connection. The most common cause for interbowel adhesions appears to be previous operative procedure involving the bowel and peritoneal surfaces. They are formed commonly after surgery and/or infection as a consequence of inflammation. Although not all patients with intra-abdominal adhesions develop symptoms, the clinical implications, such as early and late bowel obstruction, infertility, and chronic abdominal pain, remains a common problem in general surgical and gynecologic practice. The main concerns for surgeon performing adhesiolysis are bowel injury in form of perforation and re-formation of adhesions due to injury suffered by bowel in process of adhesiolysis.

There are various causes of adhesion formation, the commonest being previous surgic0al intervention involving the peritoneal surfaces. Other risk factors for adhesion formation are operative technique, duration of exposure of surfaces to external environment, exposure to foreign body, radiations and infections (eg. pelvic inflammatory disease [PID],diverticulitis, spontaneous bacterial peritonitis).

Patients can have an extremely complicated issues after surgery to lyse adhesions, including sepsis, acute renal failure, respiratory failure, myocardial infarctions, wound infections, and combinations of these conditions.

MATERIALS AND METHODS

A prospective study of management of intra- abdominal and intra bowel adhesions was undertaken in this hospital over a period of 12 months(march 2017 to February 2018. The average follow-up period was 1year. All the patients provided informed and written consent for admission into the study. The study included patients with previous intra-abdominal operation irrespective of age,sex,no of procedures done previously, and having acute, subacute or chronic bowel obstruction requiring surgery.

RESULTS

Out of 50 patients on whom this method was tried, intra operative bowel perforation developed in only three patients. These perforations were repaired with purse string suturing and burying of that part.

DISCUSSION

CAUSES OF ADHESIONS:[1]

1. Ischemic areas : Sites of anastomoses, reperitonealisation of raw areas, trauma and vascular occlusion.
2. Foreign material : Talc, starch, gauze, silk.
3. Infection : Peritonitis, Tuberculosis.
4. Inflammatory conditions :Crohn's disease.
5. Radiation enteritis.
6. Drugs :Practolol.

Factors Influencing Formation Of Adhesions :(3).

- Complexity of operation
- Extent of peritoneal trauma
- Previous illness (e.g., diabetes)
- Poor nutritional status
- Intra-abdominal placement of foreign bodies (e.g. meshes)
- Excessive coagulation with tissue necrosis
- Accompanying bacterial infection
- Laparoscopy
- Dehydration owing to high insufflation pressure and compression of capillary flow
- Dehydration owing to dry gas
- Mesothelial hypoxia owing to use of Co_2
- Laparotomy
- Dehydration owing to light and heat
- Exposure to foreign material (e.g., glove powder)
- Mesothelial dehydration and abrasion from use of dry abdominal drapes

PATHOGENESIS:

Any of peritoneal irritation results in local fibrin production which produces adhesions between apposed surfaces. The adhesion formation is exaggerated in post operative period because of the fact that fibrinolysis is decreased in this period due to decreased formation of proteins in period of stress i.e. surgery. Early fibrinous adhesions may disappear when the cause is removed, or they may become vascularized and replaced by mature fibrous tissue.Adhesions result from the normal peritoneal wound healing response and develop in the first five to seven days after injury. Within hthiss at the site of injury, polymorphonuclear leukocytes appear in large numbers meshed in fibrin strands. At 24-36 hrs, macrophages appear in large numbers and are responsible for regulating fibroblast and mesothelial cell activities. By day 2, the wound surface is covered by macrophages, islands of primitive mesenchymal cells and mesothelial cells. By day fthis the islands of primitive mesenchymal cells have now come into contact with each other. Fibroblasts and collagen are now present and increasing. By day five, an organized fibrin interconnection(band) is now seen composed of collagen, fibroblasts, mast cells, and vascular channels containing endothelial cells. The band or bridge becomes the basis for the organization of an adhesion. Protective fibrinolytic enzyme systems of the peritoneum, such as the plasmin system, can remove the fibrin gel matrix. However, surgery dramatically diminishes fibrinolytic activity. The adhesion continues to mature as collagen fibrils organize into bands covered by mesothelium and containing blood vessels and connective tissue fiber.

Procedure:

The separation of small intestinal adhesions is a serious problem because it causes perforation of intestine (Iatrogenic).
Various methods have been tried for adhesiolysis:

1. Laparoscopy :The surgical procedure of choice for adhesiolysis. The ports are placed in following order : One 10 mm port in

infraumbilical region, another at left iliac fossa region, One 5 mm port in right iliac fossa region, another at suprapubic region.
2. Scissors : A method which is usually combined with other methods of adhesiolysis.
3. Finger dissection : A common non-traumatic method which is usually used with other methods.
4. Electrosurgery : This method uses electric current as a sthisce of energy for adhesiolysis.
5. Harmonic scalpel : Used in laparoscopic adhesiolysis.
6. CO_2 laser : A precise method of adhesiolysis using gaseous energy.
7. Aquadissection : A method using high flow jet of water for adhesiolysis.

With all these methods, it is not always possible to go for local adhesiolysis.

MATERIALAND METHOD:

Figure Yankauer's Suction Cannula

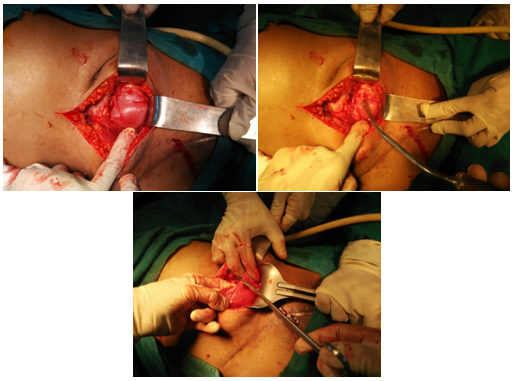

Figure showing the technique of Suction Dissection

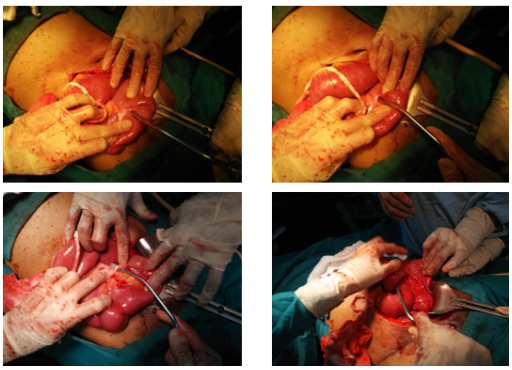

Figure showing the technique of Adhesiolysis by Suction Dissection

With this method, we use metal suction cannula(yankaeur suction cannula), having multiple holes at tip, we apply tip with continuous suction at junction at both intestine where adhesions are there.The pressure is 200 to 600 mm hg.

The suction cannula should have multiple holes at the tip so that adjacent bowel loops does not get suck inside the cannula.

In this method we apply the suction at site of adhesion, where small bowel loops are closely adherent.

With continuous suctioning, the space between the adhered intestinal loops open up without causing injury to adjacent bowel loops.

While applying continuous suction sometimes fibrous strands with opened up loops of intestine are encountered. These strands can be sharply cut with scissors to avoid unnecessary tear of serosa.

Strands may be fibrous/vascular.

With this method, most of the time goal of adhesiolysis is achieved.

Sometimes between the loops of small bowel there are dense adhesions which are very difficult to separate with continuous negative suction.

In such cases small nick is placed in the strands with knife to make little space in order to make place for insertion of suction cannula.

The tissues between fibrous/vascular bands are sucked out by suction cannula.

The tip of the suction cannula has multiple holes so while continuous suctioning it doesn't catch wall of intestine.

Outcome

A simple obstruction adhesiolysis carries a mortality of less than 1%, and mortality can be 30% or higher when strangulated or necrotic bowel is involved. Recurrence rates for adhesive bowel obstruction after conservative or operative treatment range from 29% to 53% in the literature,illustrating the chronic potential of the problem.

All the patients were operated for small bowel acute or subacute intestinal obstruction.

Past Surgical History	No. Of Patients	Intra-operative	Post-operative
Peptic Perforation Closure	11	Uneventful	Uneventful
Enteric Perforation Closure	9	Uneventful	Uneventful
Strangulated Hernia Repair	5	Uneventful	Uneventful
Pelvic Inflammatory Disease	3	Uneventful	Uneventful
Resection Anastomosis of Small Bowel	4	Uneventful	Uneventful
Incisional Hernia Repair	7	Perforation occurred in small bowel in 2 cases	Perforations repaired intraoperatively
Ileostomy/Colostomy	11	Uneventful	Uneventful

Complication

Patients can have an extremely complicated outcome after surgery to lyse adhesions, including sepsis, acute renal failure, respiratory failure, myocardial in farctions, wound infections, and combinations of these conditions.

Specifically, small bowel obstruction, chronic abdominal or pelvic pain, inadvertent enterotomy at the time of surgery, and secondary female infertility are among the most common complications caused by intraperitoneal adhesions. The paradoxical relation between surgery as a means of treating adhesions and surgery as a factor causing adhesions makes this condition a difficult one to manage.

CONCLUSION

With this method of Continuous Suction Drainage, the chances of iatrogenic bowel perforation are very few and also the intra operative time required for adhesiolysis as compared to other methods is very less. This method can safely be tried in all patients of intra abdominal adhesions.

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