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The laparoscopic repair of Duodenal atresia was first reported by Ure and Bax in 2001, followed by reports from Rothenberg and Holcomb, who described the use of “U” clips instead of using conventional suturing. Since then there has been sporadic reports of this operation. It is a technically challenging operation and requires considerable dexterity in being able to operate within a confined space requiring the surgeon to understand the ergonomics and be very adept at performing 5/0 intracorporeal anastomosis.

Most cases of duodenal atresia including duodenal membrane are amenable to laparoscopic repair, the only limiting factor is very low birth weight infants. The only relative contra-indication is when the proximal blind duodenum is very distended as this will obscure the operation site. Very low birth weight infants can have TPN until they reach about 2.0Kg.

Equipment

Only few instruments are required:

- 0 degree and 30 degree 4mm telescope
- 5mm Hasson cannula
- 20cm 3mm Koh needle holder
- 20cm 3mm curved “Kelly” forceps X 2
- Monopolar diathermy hook

Patient positioning

The patient is positioned at the foot of the table with the video monitor directly above the patient’s head. The surgeon should be sitting down and the assistant surgeon on his right. The nurse should be on the surgeons left. It is not necessary to use two monitors (Fig. 1).



Fig. 1

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The patient is intubated and paralysed, and an 8Fr naso gastric tube inserted prior to commencement of surgery. The operation is commenced with the patient supine but it will be necessary to tilt the patient into reverse Trendelenberg but only after insertion of the hand instruments.

Port Position and Placement

The first port for the telescope is inserted in the umbilicus by open laparoscopy. While our practice is to insert this in the supra-umbilical skin crease, in the case of Duodenal Atresia repair, our preference is to place the port in the infra-umbilical skin crease as it allows for easier visualization of the falciform ligament to hitch it up to the anterior abdominal wall.

The laparoscopic hand instruments are inserted directly through the abdominal wall after making a full thickness stab incision. There is no need to use a port. The position of these ports is critical if you are to maximize the working volume inside a small abdomen. The left handed instrument is placed in the Right Iliac Fossa, taking care to avoid the inferior epigastric vessels. It is best to insert this instrument first, before tilting the patient into reverse Trendelenberg. The right handed instrument should be in the left paracolic gutter, approximately parallel to the intended line of anastomosis (Fig. 2).



Fig. 2

Operative Technique

The first step of this operation is to hitch the falciform ligament to the anterior abdominal wall. This is best performed by passing a ½ circle needle through the full thickness of the anterior abdominal wall to the right of the falciform ligament, and winding it twice around the falciform at its liver attachment, and then passing it through the abdominal wall at approximately the same position. Traction on this “hitch stitch” will lift the falciform ligament and the accompanying liver onto the anterior abdominal wall, creating the much needed room to manipulate your instruments. Fig. 3

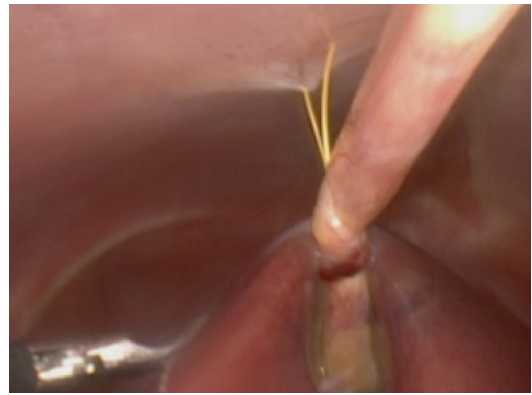


Fig. 3

Next you should identify the proximal dilated duodenum. The stomach is often still distended with gas and it is best to ensure that the stomach is completely empty. Follow the stomach to the antrum where you will find the vein of Mayo which demarcates the first part of the Duodenum from the Stomach. The hepatic flexure should be detached at this point and if the patient is in reverse Trendelenberg, it should fall away from the operative site, to expose the lesser sac. Fig. 4

The duodenum is followed distally to its blind distal end. Avoid injuring the head of the pancreas which lies in close anatomical relation to the medial wall of the dilated duodenum. The dilated proximal duodenum can be lifted out of the lesser sac with one instrument and blunt gentle dissection used to identify the blind distal duodenum by following the pancreatic head. This is an important landmark as it is not possible to perform

this operation without confidently identifying the blind distal atretic end (Fig. 5). In the case of duodenal webs or incomplete atresia, you will notice an abrupt narrowing of the distal duodenum at the position of the web.

Once the distal duodenum is confidently identified, the duodenum and pancreas can be lifted en bloc out of the lesser sac but using a transabdominal transfixion suture (Fig. 6).

The lateral most part of the proximal blind duodenum is then identified and sutured to the end of the distal atretic duodenum. The medial wall of the proximal blind duodenum is then sutured to the side of the distal duodenum about 15mm medial to the first stay, in preparation for an end to side duodenoduodenostomy (Fig. 7). It is not necessary to perform a diamond or kite anastomosis.

With both the proximal duodenum and distal atretic duodenum properly aligned in close proximity, the proximal and distal atretic duodenum are opened between the stay sutures with monopolar hook diathermy, creating an end to side anastomosis of about 15mm (Fig. 8).

The posterior walls of the duodenum are then anastomosed together using a continuous 5/0 PDS starting from the lateral angle and towards the medial stay. The integrity of the posterior anastomosis is now inspected to ensure that it is not necessary to place reinforcing sutures (Fig. 9).

The anterior anastomosis is then completed using continuous 5/0 PDS starting from the lateral-most angle. The completed anastomosis is then inspected (Fig. 10) to see if it may be necessary to insert a few interrupted sutures in the anterior layer.

The falciform hitch stitch is then removed and the duodenum is returned to its bed.

The abdomen is deflated, the purse string at the Hasson port is tightened and skin closed with topical skin adhesive.

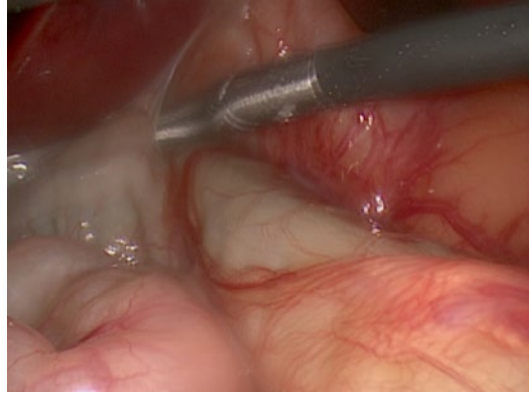


Fig. 4

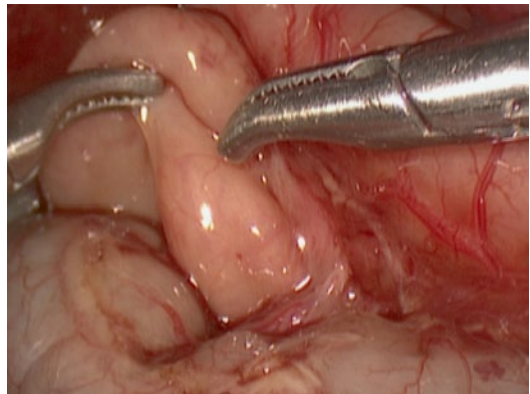


Fig. 5

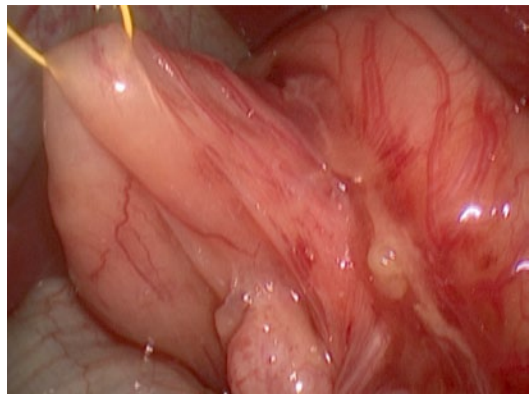


Fig. 6

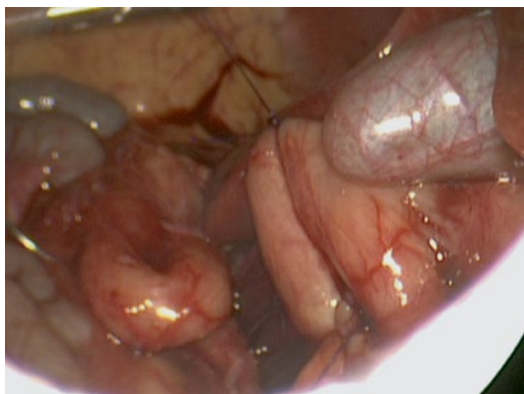


Fig. 7

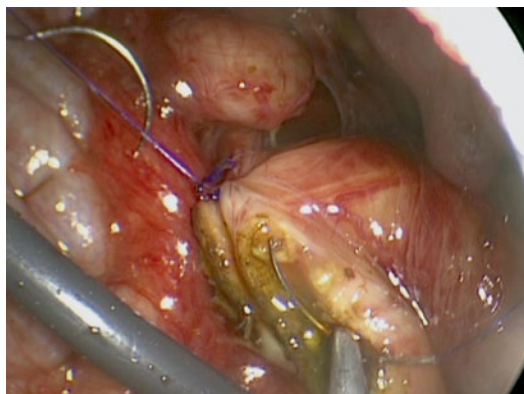


Fig. 8

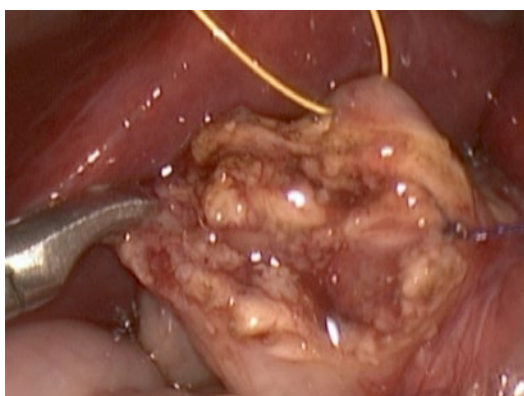


Fig. 9

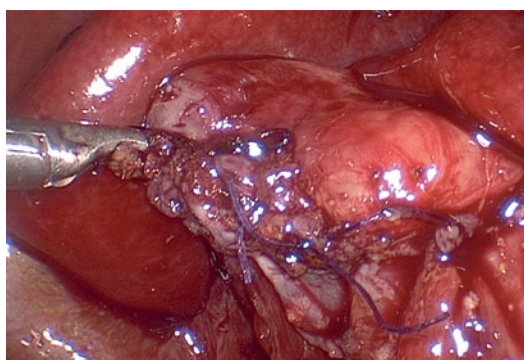


Fig. 10