

1 Port insertion sites

- 1.1 Umbilical port
- 1.2 RIF port
- 1.3 Umbilical port
- 1..4 Other ports

1.1 INSERTION OF THE UMBILICAL PORT (1) 10 mm. port

1.2 INSERTION OF THE RIF PORT (2) CHOOSE THE SITE

Over the site of the appendix.

Tap on the skin to show the site.

Make sure there is at least 50mm. space between the inside of the abdominal wall and the viscera at the port insertion site.

CHECK THE PORT

Use a 5mm. port

Round ended cone trocar used at LIMIT

Needs a lot of effort.

No value in rotating the trocar.

Other trocars can be rotated.

Cutting trocars easier to push through.

Check that any screw or clip to lock the trocar into the port is fastened.

Hold the trocar and port in your right hand.

Place a finger on the port to prevent overinsertion.

INCISE THE SKIN

Make an 8mm. skin incision.

INSERT THE TROCAR

Through the fat.

Through the abdominal muscles and aponeuroses.

Short jabbing movements (10mm.) of the trocar into the abdominal wall. Protected movements to prevent the trocar suddenly pushing through and hitting the viscera.

2 jabs per second. Expert needs 20+, novices will need more to get through the abdominal wall.

Avoid lateral umbilical ligaments – go cephalically

Slow down when you can see the point has penetrating the peritoneum.

Point upwards towards.

End up with 10mm. of the port showing.

Beware trocar insertion too high.

Keep camera away from the abdominal wall to give a clear view.
 Keep point within view all the time.
 Don't try to push the peritoneum over the trocar tip with a grabber.
 It rarely works. Persist with jabs.

BEGINNERS' DIFFICULTIES

Not jabbing fast enough.
 Not jabbing strongly enough. No progress through abdominal wall.
 Using prolonged pressure. This simply stretches the peritoneum over the trocar tip.
 Pointing the trocar directly at the caecum.
 Hesitating.
 Trocar point not in camera view when jabbing.
 Camera too close to the trocar point.

1.3 INSERTION OF THE UMBILICAL PORT (3)

CHOOSE THE SITE

In the midline, 50mm. above the pubis.
 Tap on the skin to show the site.
 Make sure that the bladder is not enlarged.
 If enlarged:
 Insert a urethral catheter.

CHECK THE PORT

Use a 5mm. port
 As for the RIF port.

INCISE THE SKIN

Make an 8mm. skin incision.

INSERT THE TROCAR

Use the left hand
 Point the trocar towards the upper abdomen, well in front of the caecum and small bowel.

BEGINNERS' DIFFICULTIES

As for the RIF port.
 Inadvertently puncturing the bladder.
 Insert a urethral catheter.
 Reinsert the trocar above the bladder.

2 FINDING THE APPENDIX

Para ileal appendix
 Pelvic appendix
 Retrocaecal appendix

3 FINDING OTHER PATHOLOGY

- Ovarian cyst
- Meckel's diverticulum
- Ovarian carcinoma
- Crohn's disease
- Tuberculosis

4 SERIOUS APPENDIX PATHOLOGY

- Adhesions
 - Omental adhesions
 - Small bowel.
- Abscess.
- Perforated appendix.

5 DECIDING ON APPENDICECTOMY

**6 DISSECTING THE APPENDIX
FREE OFF ADHERENT ADHESIONS**
Use diathermy scissors.

**7 DISSECTING THE MESOAPPENDIX
HOLD THE APPENDIX**

- Hold the end of the appendix with the suprapubic port grabber.
- Hold the appendix up vertically and taut.

SWEEP OMENTUM AWAY

- Use diathermy scissors in the RIF port.

FREE OFF PERITONEAL FOLDS ALL ROUND THE APPENDIX AND MESOAPPENDIX

- Use diathermy scissors.
- Coagulate (for 2 second) and then cut
- Check that all the folds are freed.

IDENTIFY THE MESOAPPENDIX

- This is a bulky bunch of fat usually on the lateral side of the appendix. It contains the appendiceal artery and its branches running to the appendix as far as the tip.

IDENTIFYING THE CAECO-APPENDICEAL JUNCTION

- This is a useful identifiable point for controlling the mesoappendix.
- Grasp the appendix 30mm. from the caecum with the RIF (?suprapubic) grabber.
- Sweep the caecum downwards.
- Dissect the caecum clear of adventitia.

Identify the junction from below or above depending which gives the best view.

The junction is usually avascular.

OPEN UP THE CAECO-APPENDICEAL JUNCTION

Use the grabbers in the RIF port.

Push in.

Open the jaws to stretch the tissues.

Withdraw the forceps from the space.

Close the forceps.

Repeat the sequence until the junction is open 10mm. wide.

EXTEND THE OPENING ONTO THE APPENDIX

Make the opening 20mm. in diameter.

Check the appendix is free from strands of adventitia or blood vessels.

If blood obscures the view

Clear the blood with suction/irrigation.

EXTEND THE OPENING ONTO THE CAECUM

Clear a circular area 30mm. in diameter at the appendix base.

CUT THE MESOAPPENDIX.

Hold the appendix upward to display the free edge of the mesoappendix.

Sweep any tissues away from the free edge.

Use coagulation grabbers.

Chose the site for cutting the mesoappendix.

30mm. from the caecum to prevent diathermy damage.

Change to diathermy scissors in the RIF port.

Touch the free edge of the mesoappendix with the diathermy scissors.

Coagulate for 3 seconds.

Cut slowly over 2 seconds.

Sweep the freed tissues away with the scissors Identify the appendiceal artery.

The artery is a round pink tube with some minor bleeding.

Coagulate the artery.

5 seconds.

Cut through the artery and fat.

Change the position of the holding grabber to identify the remaining part of the mesoappendix again.

Diathermy/cut with scissors from the front and the back to finish the cutting of the mesoappendix.

Use up to 10-20 second bursts of diathermy to cut

through in 3 or more goes.

Coagulate all residual strands back and front.
Check there is clear caecum 30mm. diameter around the appendix base.

For any thicker strand, that may contain the appendicular artery:

Change to diathermy grabbers.

Coagulate the strand over a 10mm. length (2 forcep widths) for 5 seconds at each site.

Change back to diathermy scissors.

Recoagulate with scissors 4 seconds.

Cut slowly with scissors (3 seconds).

.If there is bleeding:

Touch the area with the scissors and coagulate for 5 seconds.

Repeat twice, if necessary.

If this does not stop the bleeding:

Grasp the vessel with diathermy grabbers.

Coagulate.

If this does not work:

Apply a clip.

Repeat with up to 3 clips, if necessary.

If this does not work:

Consider converting to an open operation.

ALTERNATIVE DISSECTION

DISSECT THE MESOAPPENDIX OFF THE APPENDIX

This is a steady dissection of the mesoappendix from the tip of the appendix down to the caecum.

Hold the appendix in suprapubic grabbers.

Start from the appendix tip.

Dissect downwards towards the appendix base.

Continues repositioning the grabber further down the appendix.

This will keep the appendix on the stretch and to keep the mesoappendix in view.

Beware of the appendix being very slack in an S shape.

Dissect the mesoappendix from above.

Pull the caecum down towards the pelvis to display the upper aspect of the mesoappendix.

Dissect the mesoappendix from below.

Swing the appendix and caecum cephalically to display the under side of the appendix.

USING CLIPS

Clips are an acceptable alternative to diathermy.

They are slow, because of changing from clip applicator to grabbers and back.

Dissect out strands of tissue that are narrower than the clips and at least 15mm. long.

Place a clip at top and bottom of each strand, 15mm. apart.

Cut the strand half way between the clips.

BEGINNERS' DIFFICULTIES

Strand on free edge of mesoappendix too broad for the clip.
Insufficient length of strand dissected for safe clipping.

Posterior jaw of clip applicator not seen on 4 out of 5 clippings. Danger of clipping the ovary.

Second clip applied too close to the first for safe cutting (< 10mm).

Scissor rotation wrong.

Scissor cut made too close to the distal clip. (<1mm.).

Second strand clipped in the opposite order to the first strand.

Uncertainty about the surgeon's aims.

Scissors used to cut without previous coagulation.

8 ENDOLOOPING THE APPENDIX

PLACE THE FIRST ENDOLOOP

Insert it into the peritoneal cavity via the suprapubic port or RIF port. Easier to snug up with right hand.

Keep the length of introducer inside the peritoneal cavity to 10mm.

This will prevent the loop being too near the viscera.

Keep the knot within 10mm. of the endoloop introducer for easy manoeuvring.

Reduce the size of the loop to 20mm. for easy manoeuvring.

Do this by pulling the loop back up the port.

Lie the loop east/west on the appendix.

Pass the grabber from the RIF port through the loop and up the grabber stem 50mm.

Grasp the appendix within 20mm. of its tip for easy passing through the loop.

Draw the appendix through the loop to the appendix midpoint.

Hold the appendix vertically in the RIF grabbers.

Open the loop to 50mm. for easy placing on the caecum.

Manoeuvre the loop onto the caeco-appendix junction.

Push and pull as you tighten the endoloop.

Gradually reduce the size of the loop to fit the appendix base.

Rotate the endoloop to remove any twist in the loop.

Tighten the loop onto the appendix base.

Use 1000gm. pull. Less, if the loop feels as if it is cutting through the appendix.

If the loop does not tighten up:

Cut it free and use another loop.

If the loop slips:

Cut it free and use another one.

If the loop cuts through the appendix:

Remove the loop.

Stitch off the defect in the caecum.

Place an endoloop on the appendix stump.

Remove the appendix.

Do a peritoneal toilet.

If the appendix stump will not close:

Consider stapling the defect.

If the stapling is not successful or insecure:

Convert to an open operation.

Trim the loose end of the endoloop 5mm. long.

Cut the long end of the endoloop 5mm. long.

This will prevent the ends encroaching on the other endoloops.

PASS THE SECOND ENDOLOOP

Place it 20mm. distal to the first endoloop.

This will give sufficient distance for placing the third endoloop and safely cutting of the appendix.

If the loop cuts through the appendix:

Remove the loop.

Place another endoloop on the appendix.

Remove the appendix.

Do a peritoneal toilet.

PASS THE THIRD ENDOLOOP

Place the loop 5mm. distal to the first loop.

The appendix is now double looped for safety.

There is 15mm. appendix between the second and third loops for safe cutting.

le there will be a 7.5mm. cuff of appendix adjacent to the loops.

If this third loop ties exactly over the first loop:

Cut the ends of the third loop 5mm. long.

Place a fourth loop in the correct position 5mm. distal to the first loop.

If the fourth loop slips down on the first and third loops:

The second loop was probably too near the first.
Consider accepting the first and third loops lying together.

Resolve to get it right next time you do an appendicectomy.

BEGINNERS' DIFFICULTIES

Endoloop passed down the RIF port instead of suprapubic port.

Camera too close to the viscera. Structures not visible.

Pusher passed too far in. Not enough space for an adequate loop within the field of view.

Endoloop knot not pushed down the introducer tube into the peritoneal cavity. No idea how big the loop would be.

Knot too far from the end of the loop introducer. Led to difficult manoeuvring the loop down the irregularities of the appendix.

Loop too large.

The loop curled up on the viscera.

Loop not passed up the stem of the grabber far enough. Loop escaping from the grabber.

Wild movement of grabber nearly damaged small bowel.

Appendix grabbed 50mm. from its tip. This made the appendix snag on the endoloop when pulling through.

Appendix not held up vertically on 3 occasions. Once, because the grabber was in the umbilical port instead of the RIF port.

Difficulty getting the loop onto the caecum. The introducer in the RIF port was coming in at the wrong angle

Same reason for difficulty with tightening the endoloop.

Second loop applied proximal to the first.

Second loop tangles with long free ends of the first loop.

Second loop applied over the first. No attempt seen to correct this.

9 CUTTING THE APPENDIX

Hold the appendix upwards with the grabbers in the RIF port.

Hold the appendix to lie perpendicular to the scissors coming from the umbilical port.

Cut the appendix half way between the two relevant loops.

Use 1mm. snips if the scissors seem blunt.

ALTERNATIVE:

Leave the end of the most distal endoloop attached to the appendix and run back into the umbilical port.

Pass the diathermy scissors through the same umbilical port.

BEGINNERS' DIFFICULTIES

Appendix not held perpendicular to the line of the scissors.

Scissor blades not rotated to be perpendicular to the appendix.

Appendix cut too close to one of the loops.

Too close to the appendix stump loop may increase the risk of stump blow out.

Too close to the appendix may lead to the distal loop slipping, leading to leakage from the appendix.

Too big bites of the appendix with the scissors.

Scissors seem blunt. Persistence with blunt scissors instead of requesting new ones.

Scissors in umbilical port. Wrong if the surgeon is right handed.

10 REMOVING THE APPENDIX

IF THE APPENDIX IS NOT INFLAMED:

Hold the appendix with the grabbers in the 5mm. RIF port.

Hold the appendix by its cut end.

Pull the appendix up the RIF port.

IF THE APPENDIX IS INFLAMED OR TOO BULKY TO PASS THROUGH THE RIF PORT:

Use a retrieval bag to pull the appendix through the 5mm. RIF port.

Place the appendix on the ascending colon. Detach the grabber from the appendix.

Use both grabbers to manoeuvre the bag.

Pass a retrieval bag down the suprapubic port.

Use the grabbers in the suprapubic port to push it down into the peritoneal cavity.

Position the bag in the pelvis, and not on the viscera.

The opening faces the caecum.

The base faces the bladder.

Make sure the bag is laid out fully, free from folds.

Use both grabbers.

Open the bag.

Use both grabbers.

Pull on the tag on the upper side with the suprapubic grabber.

Pull on the tag on the lower side with the RIF grabber.

Open the bag fully down to its bottom.

Hold the bag open with the suprapubic grabber.

Hold the appendix by its middle using the RIF grabber.

Place the appendix fully in the bag right down to the bottom.

Release the grabber from the appendix.

Grasp the tags on the both edges of the bag with the RIF grabber.

Pull the bag up the RIF port.

BEGINNERS' DIFFICULTIES

Bag lying folded on the viscera.

Difficulty getting the appendix into the bag because the bag is bent over.

Bag not opened fully.

Grabber would not release the appendix.

Pull the appendix out and take a more delicate grip.

Difficulty grabbing the 2 tags with the RIF grabber.

Take more care.

Holding the appendix in the RIF grabber and manoeuvring using the suprapubic grabber.

- 11 PERITONEAL TOILET
- 12 CHECK FOR BLEEDING
- 13 REMOVE INSTRUMENTS
- 14 REMOVE PORTS
- 15 CLOSE WOUNDS
- 16 ANAESTHETISE WOUNDS
- 17 END OF OPERATION