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RESEARCH ARTICLE

LAPAROSCOPIC VASCULAR INJURIES DURING TROCAR ENTRY IN GYNAECOLOGICAL SURGERIES

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Abstract

Major vascular injuries that cause massive Haemorrhage are rare but fatal. Approaches to reduce this complication and to standardize its management are required. Most of these injuries occur at entry. There is a rise in morbidity and mortality when surgeons do not recognize and treat these injuries early. The purpose of this study was to assess laparoscopic vascular bleeding during trocar entry and its outcome.

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Introduction:

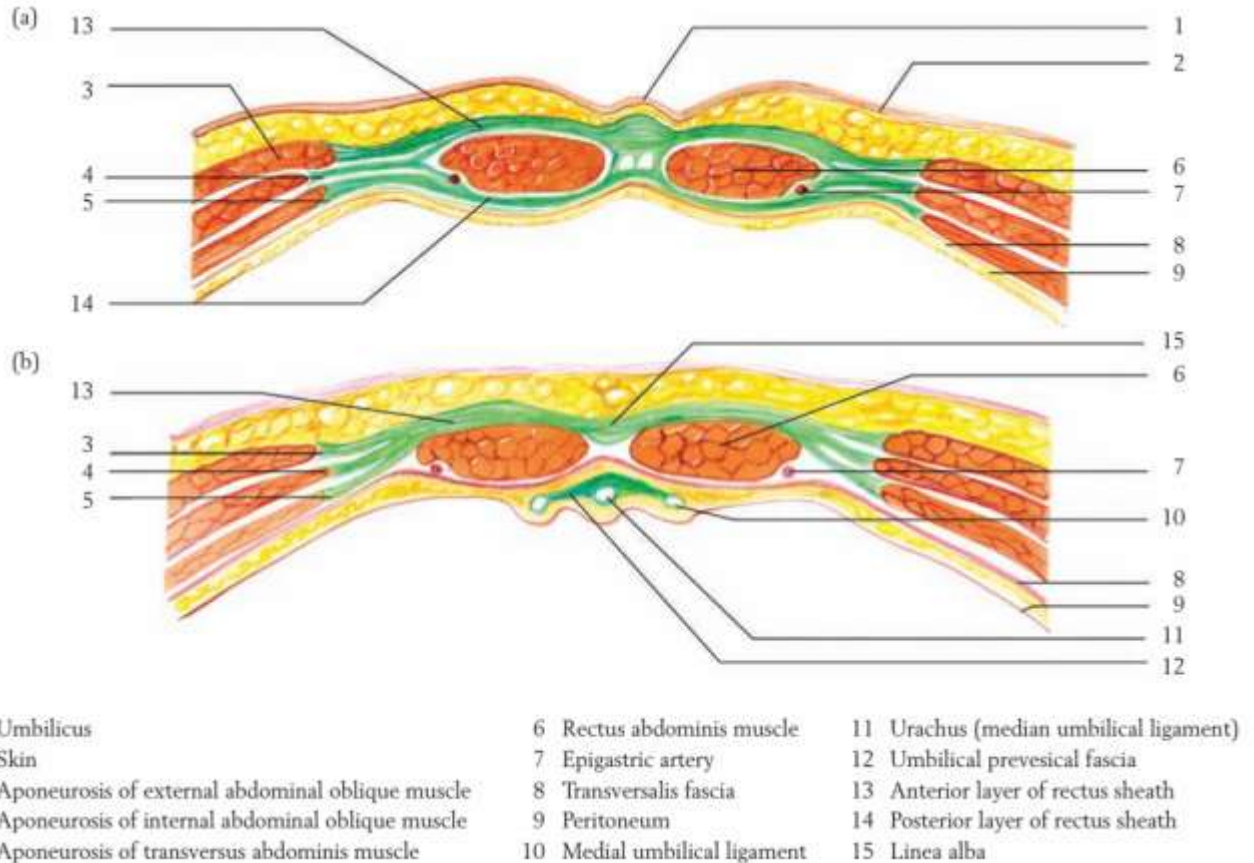
Laparoscopy over the past two decades has evolved to a point where it is considered the primary approach to most gynaecological problems.

In Gynaecology like in any other surgical field, an extensive knowledge of the human anatomy is made even more key with the advancement in laparoscopic surgery. Without the knowledge of what structures to avoid in laparoscopy and what to do if one cannot avoid them, laparoscopy can become hazardous due to the surgeon's lack of awareness.

The Laparoscopic trocar or needle penetrates several layers of the abdominal cavity. The aponeurosis is stuck to the peritoneum near the umbilicus and is pierced in one go. The umbilicus projects towards L4 in 67% of cases. (1) The umbilicus is situated opposite to the aortic bifurcation in 80% of cases to within 2cm of it (1).

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A very dangerous situation is seen in patients who are thin built and the bifurcation of the aorta is seen opposite to the umbilicus. In 50% of cases, it might be perpendicular to the left common iliac vein which crosses the promontory near the midline.

Major Vascular injuries in Gynaecology are rare but may often be fatal (2).

One should be able to develop approaches to reduce these injuries and standardize their management.

In this write up, we try to outline the factors that lead to vessel injury during trocar entry, prompt detection and management which can be lifesaving.

Duration of the study –
2017-2022

Objective:-

The purpose of this study was to assess laparoscopic vascular bleeding during trocar entry and its outcome.

Methodology:-

Retrospective study.

At Smt. Kashibai Navale Medical College, Pune from 2017-2022.

Incidence of vascular injury and their potential sequelae

The overall figure for great vessel injury is 0.5/1000 (3). The incidence of major retroperitoneal vascular injuries with aVeress needle entry is reported to be up to 1/1000 (four injuries in 3591 cases) (4).

Catastrophic damage due to laparoscopic injuries is one of the most dreaded complications. Most injuries can occur at entry and can be immediately fatal. Molloy et al. analysed major vascular injury complications of primary port entry in 61 studies.

The overall incidence was 0.4/1000 (1 in 2500) (4/7). Mortality is reported to be 12–23% (5)

At Smt. Kashibai Navale Medical College, Pune from 2017-2022.

21 Patients who had undergone laparoscopic procedures and suffered following vascular injuries during the same -

- 1 common Iliac
- 9 Inferior epigastric
- 2 Mesenteric vessel injuries
- 2 Omental vessels
- 4 muscular / supra peritoneal at the secondary port site
- 3 umbilical port entry vessels

Vessel Injured	No. of Cases
Common Iliac	1
Inferior Epigastric	9
Mesenteric Vessels	2
Omental Vessels	2
Muscular/Supraperitoneal – Secondary Port Site	4
Umbilical Port Entry	3
Total	21

Risk Factors

Over 70% of injuries are reported to be occur on the right side (6). A review of 31 cases, of primary trocar injuries, demonstrated that 26/31 (83.8%) of injuries occur on the right (7).

The iliac artery is the most commonly injured vessel on the right side, and the iliac vein on the left side.

Right-sided injuries are more likely with the trajectory of trocars as the operator tends to stand on the left.

Older age, malignancy, previous radiation therapy, body mass index greater than 30 kg/m², presence of adhesions and previous abdominal surgery were all identified as significant risk factors for complications and/or conversion to laparotomy (8-10)

Diagnosis

A vascular Injury might be suspected when

1. Return of blood through the insufflation needle/trocar
2. Sudden fall in the blood pressure of a previously stable patient
3. Presence of unexplained blood in the peritoneal cavity and the reappearance of this blood even after aspiration
4. Blood leaking around the port site
5. Bleeding on the omentum at the primary port site
6. Rapidly expanding retroperitoneal haematoma

Intraoperative CO₂ pressure on the bleeding vessels and decreased venous return caused by the steep Trendelenburg position may explain the failure to recognize the injury during the laparoscopy itself. These factors can sometimes delay the diagnosis of venous injuries (1)

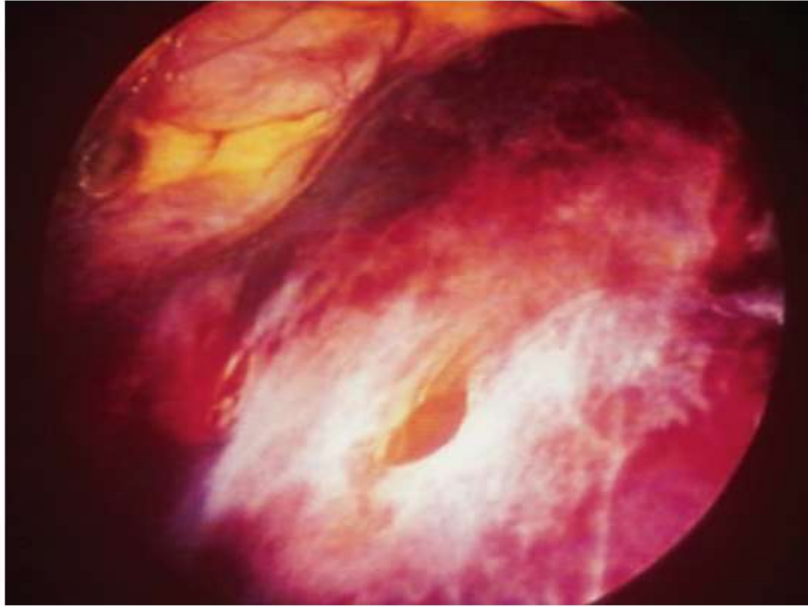


Figure 39.1 Retroperitoneal hematoma due to vena cava injury with the Verres needle

(Photos taken from Atlas of operative laparoscopy and hysteroscopy – 3rd edition – Jacques Donnez)

Management

If vascular injury with the insufflation needle is suspected, the needle is left in place to mark the site of injury while a midline incision is made for laparotomy.

Usually, in a case of major vessel injury, the retroperitoneal hematoma occupies all the fields of view, and, once laparotomy is performed, the first priority is compression of the aorta. This can be accomplished with the hand or a vascular clamp, and may reduce bleeding until a vascular surgeon arrives.

If bleeding is very minimal, endoscopic repair should be considered for small vessels, but laparotomy is necessary for major vessel injury.

Prevention

Prevention of such injuries depends on the surgeon's experience, technique, knowledge of anatomy and understanding of the procedure. Other factors like the build of the patient are also important.

Elevation of the abdominal wall before insertion helps increase the distance between the trocar and vessels. Both blunt and disposable sharp trocars have been implicated in vessel injuries.

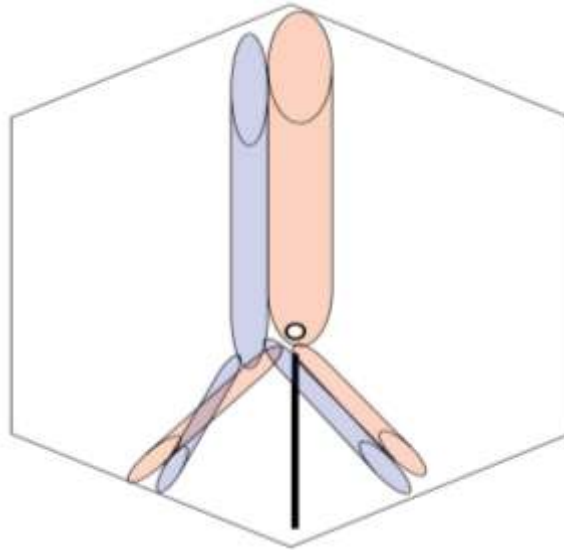
Observations:-

4 patients needed an emergency exploratory emergency laparotomy

2 of them needed blood transfusion

1 needed Resection anastomosis

5 of them developed a haematoma - 1 of them needed a laparotomy and others managed conservatively. 1 haematoma developed abscess which needed drainage subsequently.



LowerMidline Laparotomy Incision

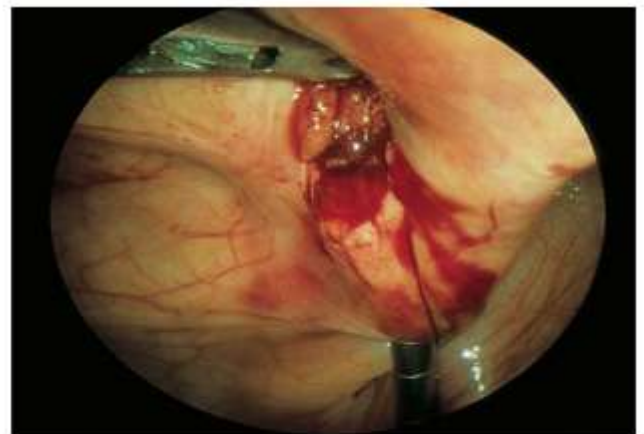


Figure 39.4 Epigastric vessel perforation



Figure 39.14 (a) A 1-cm injury to the right external iliac vein; (b) the decrease in intra-abdominal pressure is accompanied by increased bleeding

(Photos taken from Atlas of operative laparoscopy and hysteroscopy – 3rd edition – Jacques Donnez)

Results:-

21 patients suffered laparoscopic vascular injuries between 2017-2022 and vascular bleeding was controlled.

All patients needed ICU stay average for 10 days i/v/o vigorous post-op monitoring.

2 patients developed Deep Vein Thrombosis.

Surgical site infections noted in 3 patients.

No mortality seen.

Total cases 2847

Incidence 0.73%

Discussion:-

There is no one single safe technique that reduces laparoscopic surgery entry complications in low-risk patients.

Each complication has a specific aetiology that is usually preventable or at least treatable if recognized in time. Delayed diagnosis increases the morbidity and worsens the prognosis.

Surgeons should select the technique which they are the most comfortable.

The only surgeon who doesn't encounter any complication is the one who is not operating.

Complications can occur even in the best of hands and it is vital that these are recognised promptly and acted upon in haste.

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