PREVENTION, RECOGNITION AND MANAGEMENT OF VASCULAR COMPLICATIONS DURING LAPAROSCOPIC AND ROBOTIC SURGERY

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DISCLOSURE

- Consultant: Lumenis, Karl Storz Endoscopy-America

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COMPLICATIONS

- Unavoidable
- Knowledge of anatomy
- Surgical skill
- Support
Complications Outcome

- Prevention
- Recognition
- Management
First Paper on Laparoscopic Treatment of Stage IV Endometriosis


- Presented at AAGL annual meeting in 1984

"Wherever in the body a cavity exists or a cavity can be created, operative laparoscopy is indicated and probably preferable. The limiting factors are: skill and experience of the surgeon and the availability of proper instrumentation."

Skill and Experience

Knowledge of Anatomy

Proper Instrumentation

Knowledge of Devices and Energy
Cyst, R External Iliac
TREATMENT OF VASCULAR INJURY

1. Prompt recognition is key in successful treatment
2. Conversion to open repair
3. Laparoscopic repair has been described

Special Consideration in Vascular Injury Repair

- Surgeon’s skills
- Reconstruction
- Diminished visibility
- Special instrumentation

OPERATING ROOM TEAMWORK AMONG PHYSICIANS AND NURSES: TEAMWORK IN THE EYE OF THE BEHOLDER

Makary MA, Sexton JB, Freischlag JA, Holzmueller CG, Millman EA, Rowen L, Pronovost PJ.
Journal of the American College of Surgeons
APPROPRIATE QUESTIONS IN REVIEWING A CASE REPORT

1. What were the early warning signs that this could be developing?
2. If one had known it was coming, could the team have been better prepared?
3. Once confronted with the problem, what was done correctly and what could be done better the next time?
4. Could this case shed light on a mechanism of disease?
Trocar Injuries

- Trocar injury is one of the most serious and potentially preventable complications.
- Disposable trocars have features intended to prevent these injuries.
TROCAR INJURIES IN LAPAROSCOPIC SURGERY

**Results: Types of Trocar Injuries Reported to the FDA from 1993 to 1996**

<table>
<thead>
<tr>
<th>Trocar Injury</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths</td>
<td>32</td>
</tr>
<tr>
<td>Non-fatal vascular injuries</td>
<td>382</td>
</tr>
<tr>
<td>Non-fatal visceral injuries</td>
<td>176</td>
</tr>
<tr>
<td>Abdominal wall hematomas</td>
<td>30</td>
</tr>
<tr>
<td>Unclassified</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>628</strong></td>
</tr>
</tbody>
</table>
CONCLUSIONS

- Vascular injuries are more likely to be fatal if they involve the aorta or inferior vena cava.
CONCLUSIONS

- An unrecognized bowel injury is highly lethal
MAJOR VASCULAR INJURY AND LAPAROSCOPY

Iatrogenic vascular trauma

CO2 embolism during insufflation

Umbilical Bleed
Aortic Injury
EPIGASTRIC
RIP
Monopolar Scissors R External Iliac
Branch Vena Cava
Left External Iliac
PLASMA JET
VASCULAR INJURY - ROBOT
ELI Robotic
Stapler L External Iliac
Scissors External Iliac
Presacral

Cote triangle
Devices used for dissection and hemostasis in laparoscopic surgery

- Surgical clip
- Suture ligation
- Surgical stapler
- Electrosurgery
- Advanced bipolar sealing systems
- Ultrasonic desiccation
- Radiofrequency sealants
- Haemostatic agents
Hemostatic agents

- Because control of bleeding by sutures or cautery is not always effective or practical, a variety of products have been developed to achieve bleeding control by alternative means:

  - **Hemostatic agents**
    - Used to halt bleeding
    - Applied directly to a bleeding site
    - Work in the presence of actively flowing blood

  - **Sealants**
    - Used to prevent the leakage of liquids, gases and solids from surgical sites
    - Applied to dry or clamped tissue surfaces to create a barrier

  - **Glues/adhesives**
    - Used to attach tissues
Arista absorbs the serum (liquid portion of the blood) and creates a scaffold to support the fibrin mesh

- Biologically inert
- No bovine, porcine or human blood, protein or tissue sources
- Synthesized from plant material
- No risk of viral disease transmission
- Enzymatically degraded within 24 hours
- A fast acting, versatile clotting agent that produces an “instant gelling” followed by the formation of a fibrin mesh in 1-2 minutes
- Rapid control of bleeding
- Easily irrigated
- Cost and time savings
**COSEAL**

- Biocompatible polyethylene glycol polymer that rapidly cross-links with proteins in tissue to immediately adhere to the area of application.
- Indicated for use in vascular reconstructions to achieve adjunctive hemostasis by mechanically sealing areas of leakage.
- Fully synthetic, not containing any animal or human proteins or Gluteraldehyde.
- Successfully adheres to synthetic materials.
**Floseal**

- Floseal indicated in surgical procedure except in ophlatmic surgeries.
- Fossil matrix contains bovine-driven gelatin matrix components and a human trombin component.
- Don’t use in patients who are allergic to materials in bovine, on skin incisions, do not inject or compress floseal matrix into the blood vessels.
- Floseal is indicated in invasive*1 or surgically invasive*2 procedures as an adjunct to hemostasis when control of bleeding by ligature or conventional procedures is ineffective or impractical.
FloSeal
Vascular Clips
Vein Suturing
Artery Repair Clips and Suture
SUGGESTED READING

Nezhat’s Video-Assisted and Robotic-Assisted Laparoscopy and Hysteroscopy

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ENDOMETRIOSIS

ADVANCED MANAGEMENT AND SURGICAL TECHNIQUES

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SUGGESTED READING

Free online: http://laparoscopy.blogs.com/endoscopyhistory/

Second edition available online for free: http://books.google.com
Thank you

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Questions?