



Laparoskopi Trokar Girişleri, Komplikasyonlar ve Yönetimi

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Hızlı adaptasyon

**Artan kompleks
laparoskopik
prosedürler**

**Oluşan komplikasyon
türünde ve hızında
artış**

Komplikasyon nedir?

“a new problem or illness that makes treatment of a previous one more complicated or difficult”

ACT risk-management principles

- Awareness
- Communication and counseling skills
- Teamwork and training



İnsidans

**Major
komplikasyonlar**

%2,5-6

**Minor
komplikasyonlar**

**%1,1-
5,2**

Kane MG, Gastroint Endos 1984

Komplikasyon çeşitleri

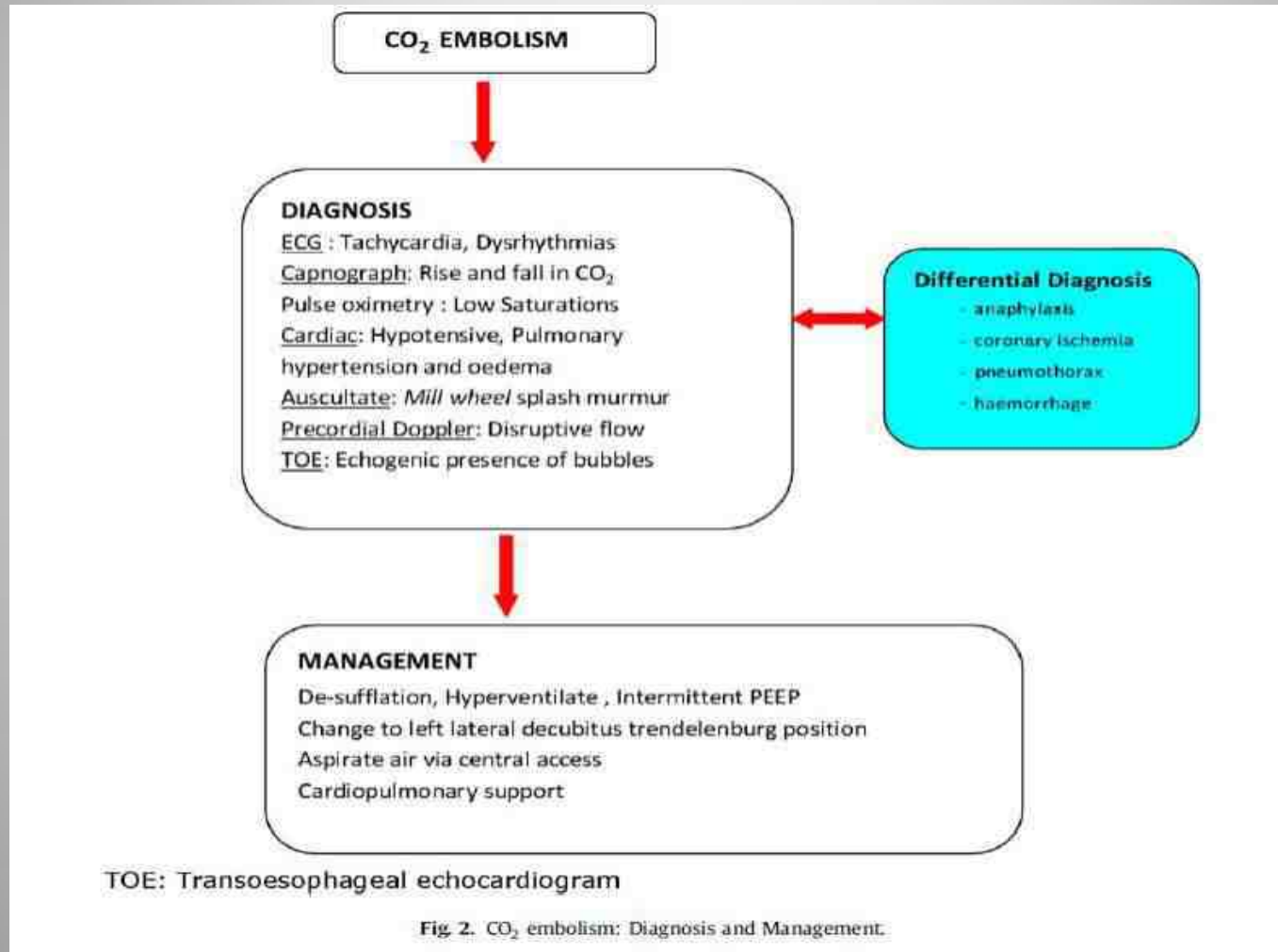
- Anesteziye bağlı komplikasyonlar
- Kardiyorespiratuar komplikasyonlar
- Veress girişi, pneumoperitonum ve insuflasyon sırasında oluşan komplikasyonlar
- Trokar girişi sırasında oluşan komplikasyonlar
- Operatif komplikasyonlar

Anesteziye baęlı komplikasyonlar

- Solunumsal sıkıntılar:
- Pa CO₂' de artış
- Amfizem ve Pnömotoraks: Siyanoz varlığı, Kapiller O₂ saturasyonu düşmesi, Cilt altı amfizemi, Pik havayolu basıncında artış uyarıcıdır. Nitröz oksit kesilir, ventilatör uygulamasına geçilir, PEEP uygulanır, batin içi basınç düşürülür.
- Aspirasyon riski
- Venöz tromboemboli
- Kardiyak aritmi ve arrest
- Gaz embolisi

Trendelenburg pozisyonu
Abdominal distansiyon
CO2 kullanımı
Uzamiş süre

Pnömooperitonyumun fizyolojik etkileri ve yönetimi



Operatif komplikasyonlar

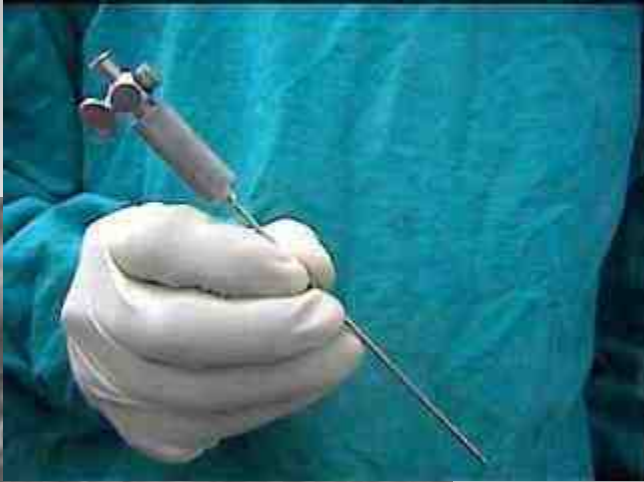
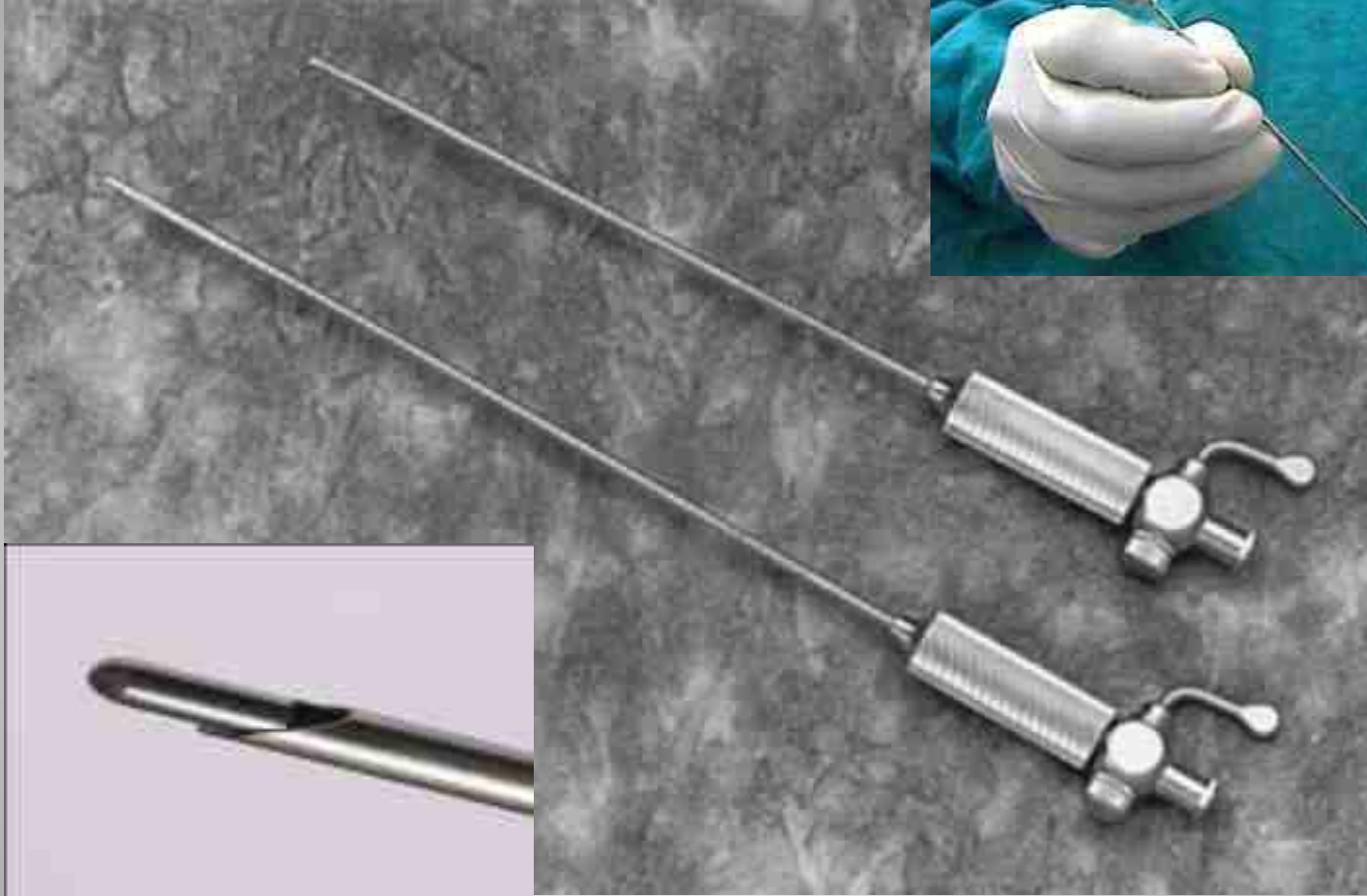
- Vasküler yaralanmalar
- GIS yaralanmaları
- Üriner traktus yaralanmaları
- İnfeksiyöz
- Termal
- Trokar bölge hernisi

LAPAROSKOPI:BATINA GİRİŞ

- Veress ile Pnömooperiton sonra Trokar
 - Trans-umbilikal
 - Palmer noktası (Sol Üst Kadran)
 - Trans- uterin
- Direkt Trokar tekniği
- Açık Laparoscopi (Hasson Tekniği)
- Optik, Ternamian, Radially Expanding Trokar tekniği

Laparoskopi Giriş Tekniği

- Hasta Dorsal Decubitus pozisyonunda (Horizantal)
- Anestezi: İyi bir relaksasyon (Kötü bir relaksasyon: Batın içi basınç artifisyal yüksek !!)
- Umbilikus insizyonu (veya Palmer noktası)
- Veress iğnesi (Batın duvarı manuel kaldırma – Çamaşır klemp)
- Aort bifurkasyon yerine göre açılendirma (45°)
- Veress : Batın içinde mi ? Güvenlik Testleri
- Batın içi basıncı geçici olarak 20-25 mmHg. olacak şekilde CO2 gazı verilir (Transient Overpressure).
- Pnömooperiton oluşturulduktan sonra infraumbilikal olarak trokar ile batına girilir (Sagital- 45°). Basınç düşürülür (12-15 mmHg)
- Laparoskop (Optik), kamera aracılığı ile görüntü monitöre aktarılır. Batın inspeksiyonu yapılır.
- Bütün diğer girişimler laparoskopik görüntüleme ile yapılır.



STORZ
KARL STORZ - ENDOSKOPIE



electronic endoflator

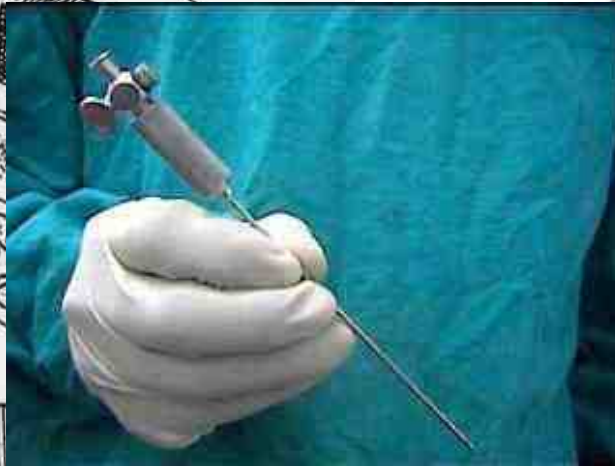
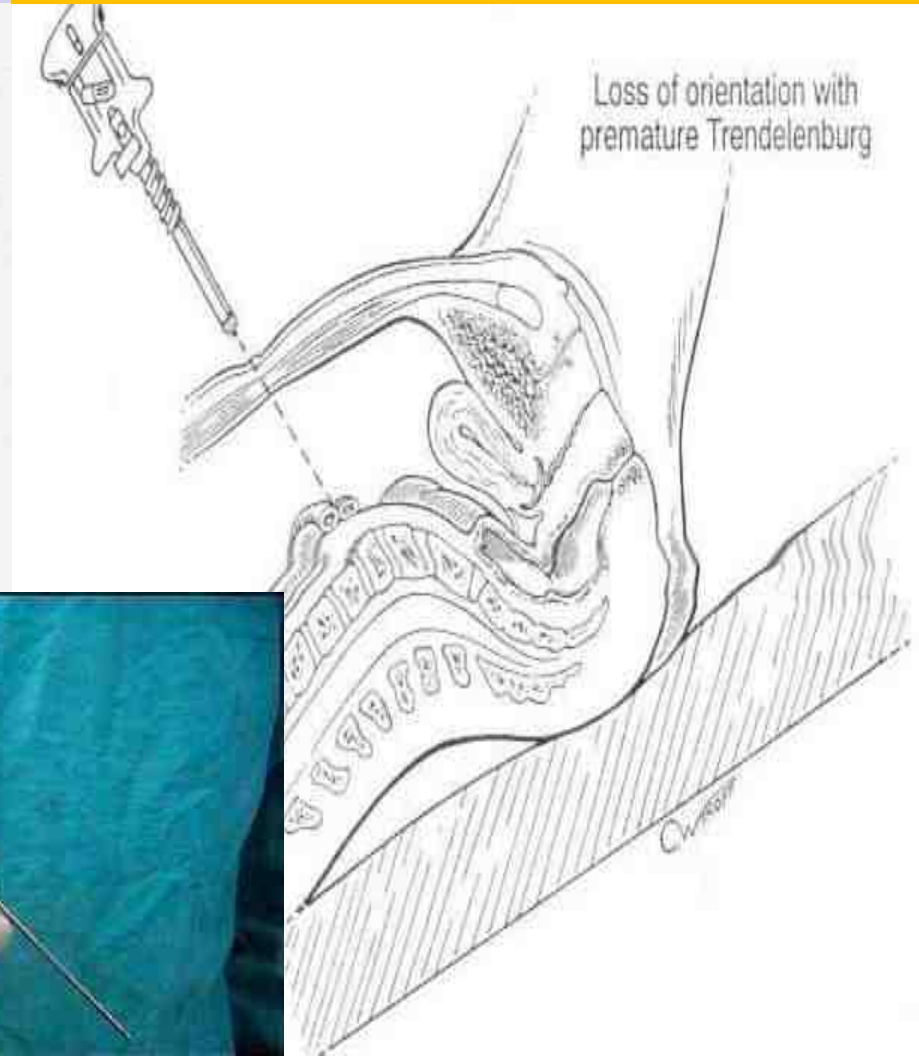
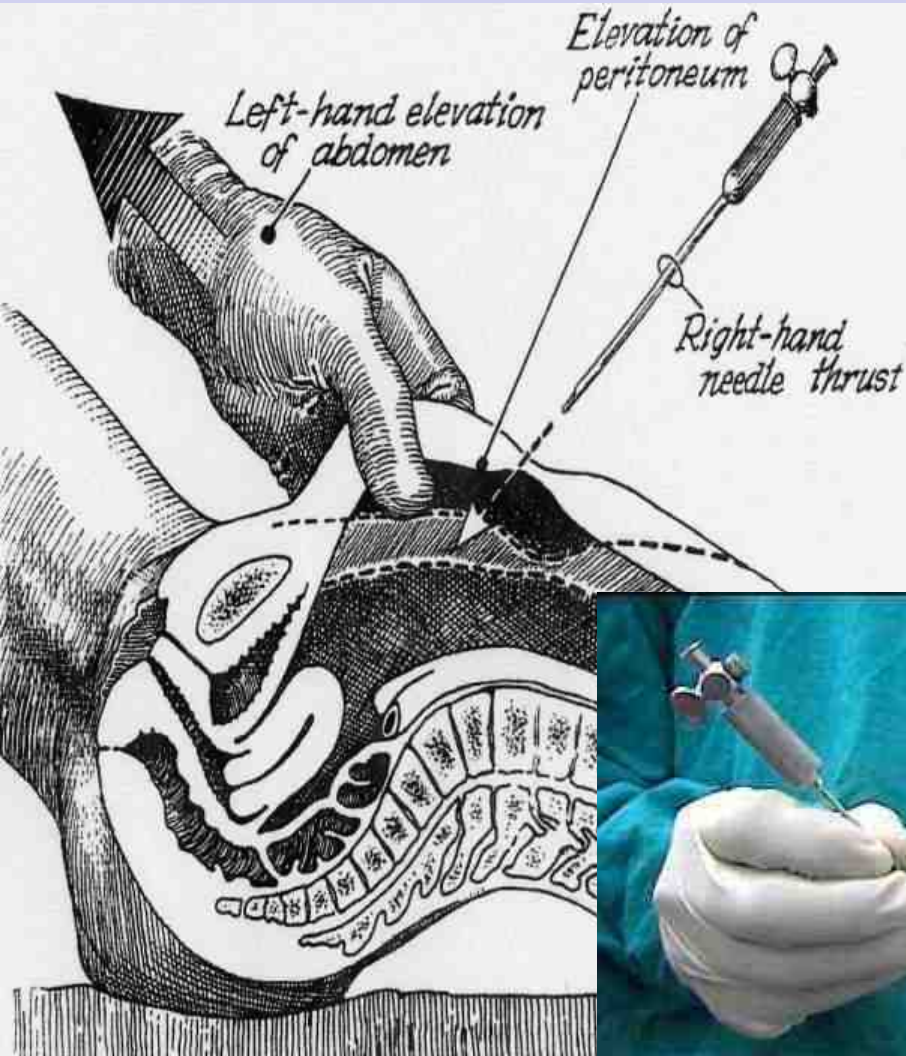
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Veress insersiyonu

Supine Dorsal Decubitus

Trendelenburg



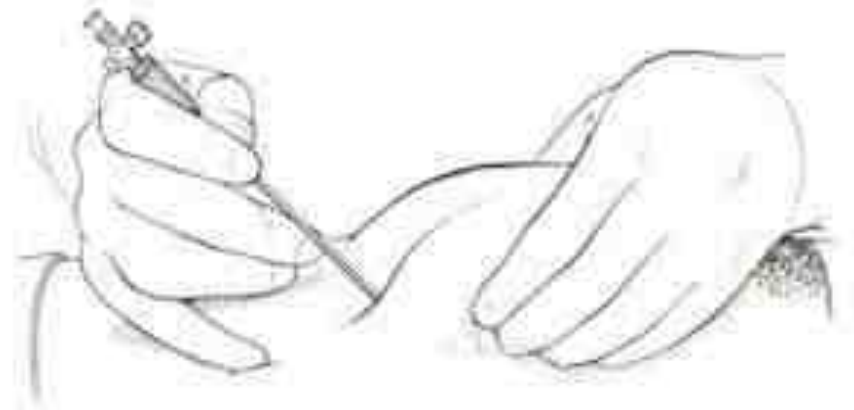


VERESS İĞNESİ GÜVENLİK TESTLERİ

- Palmer's test (Şırınga Testi)
- Basınç profil testi (İntraabdominal P <10 mmHg)
- Double click akustik test
- Hanging saline drop test



**VERESS : GİRİŞ DENEMESİ
KOMPLİKASYON ORANLARI**
(Extraperitoneal insuflasyon,
omentum-barsak yaralanması,
başarısız L/S)



1

% 0,8 – 16,3

2

% 16,3 – 37,5

3

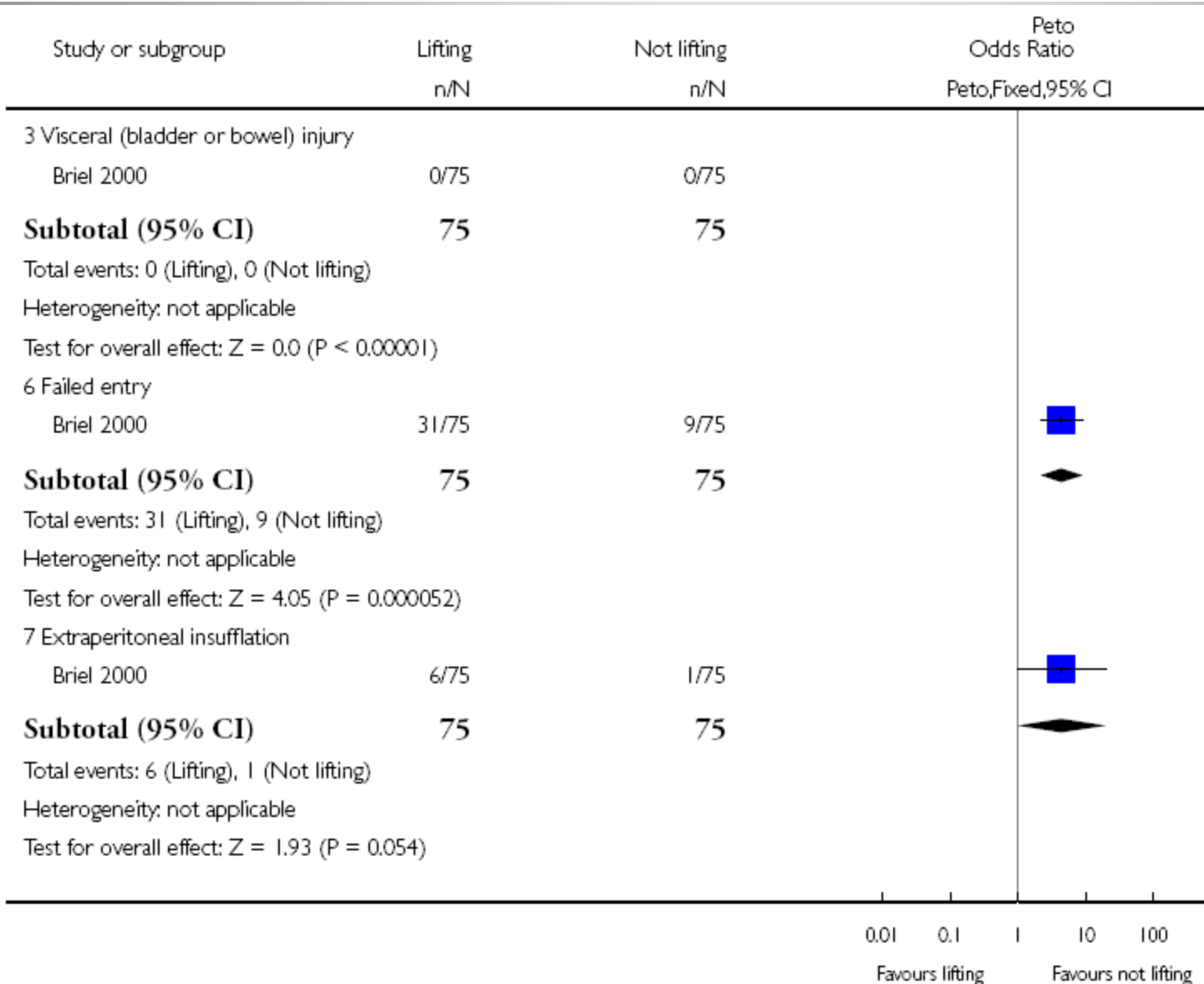
% 44,4 – 64

>3

% 84,6 – 100

Laparoscopic entry techniques (Review)

Comparison 10 Comparisons of other laparoscopic-entry techniques, Outcome 1 Lifting versus not lifting the abdominal wall before Veress Needle insertion.



LAPAROSKOPI:BATINA GİRİŞ

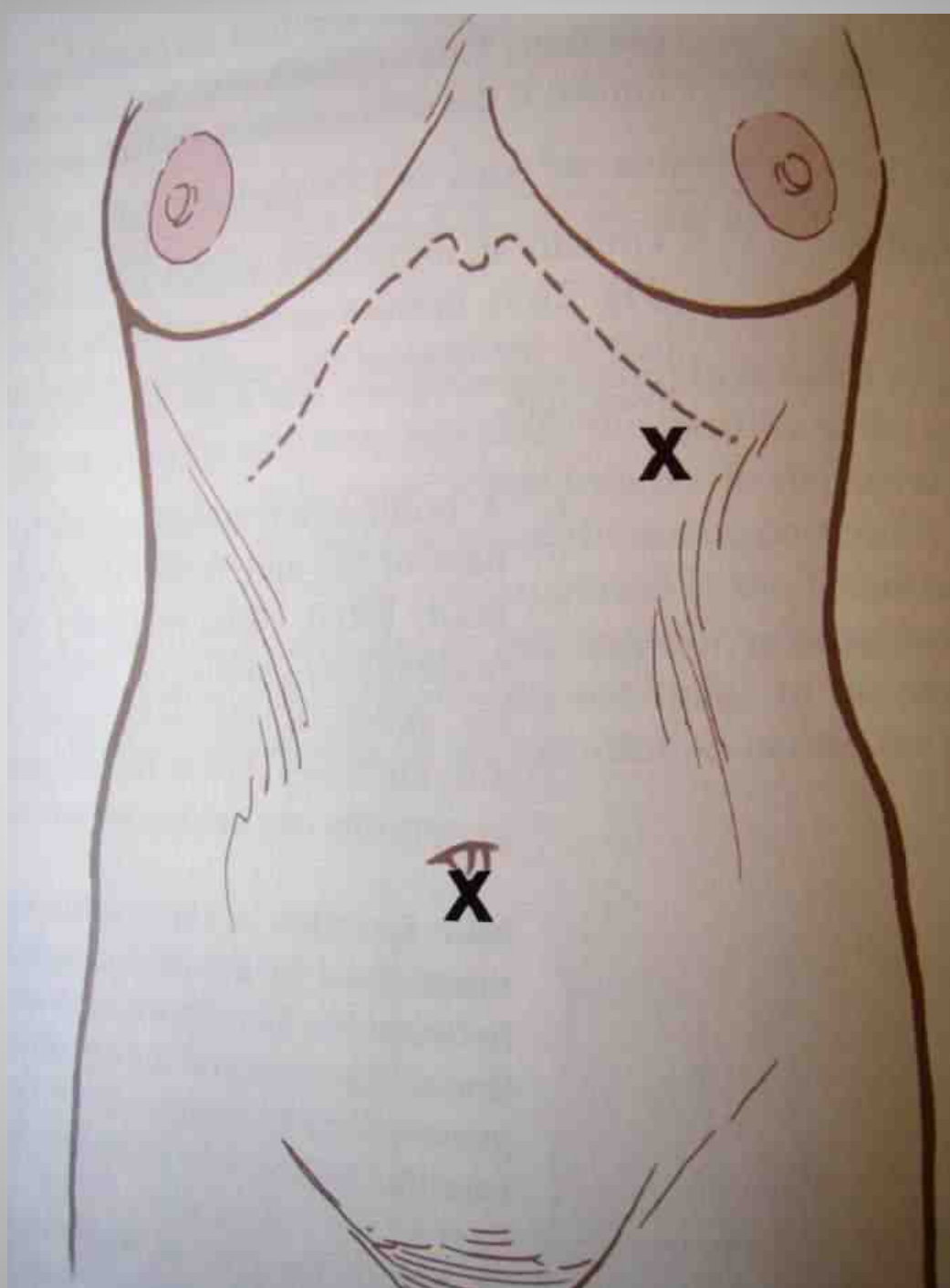


PERİUMBİLİKAL ADEZYON PREVALANSI

Micro laparoscopy	No previous surgery N=469 (%)	Previous laparoscopy N=125 (%)	Previous transversal laparotomy N=131 (%)	Previous midline laparotomy N=89 (%)
Peri-umbilical adhesions	0.68	1.6	19.8	51.7
Severe peri-umbilical adhesions	0.42	0.8	6.8	31.4

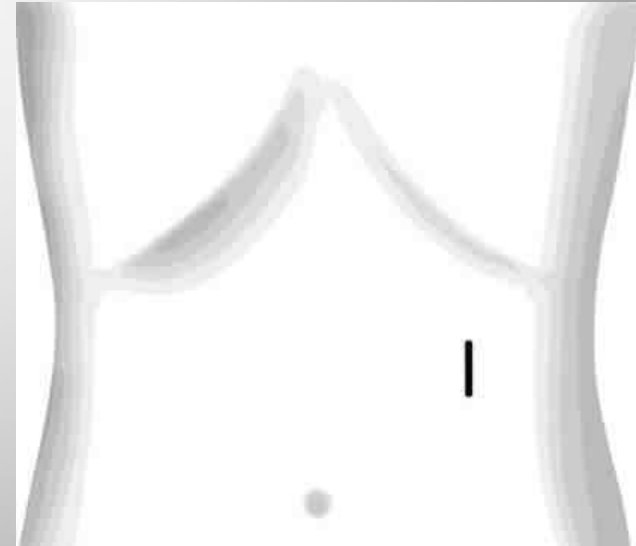


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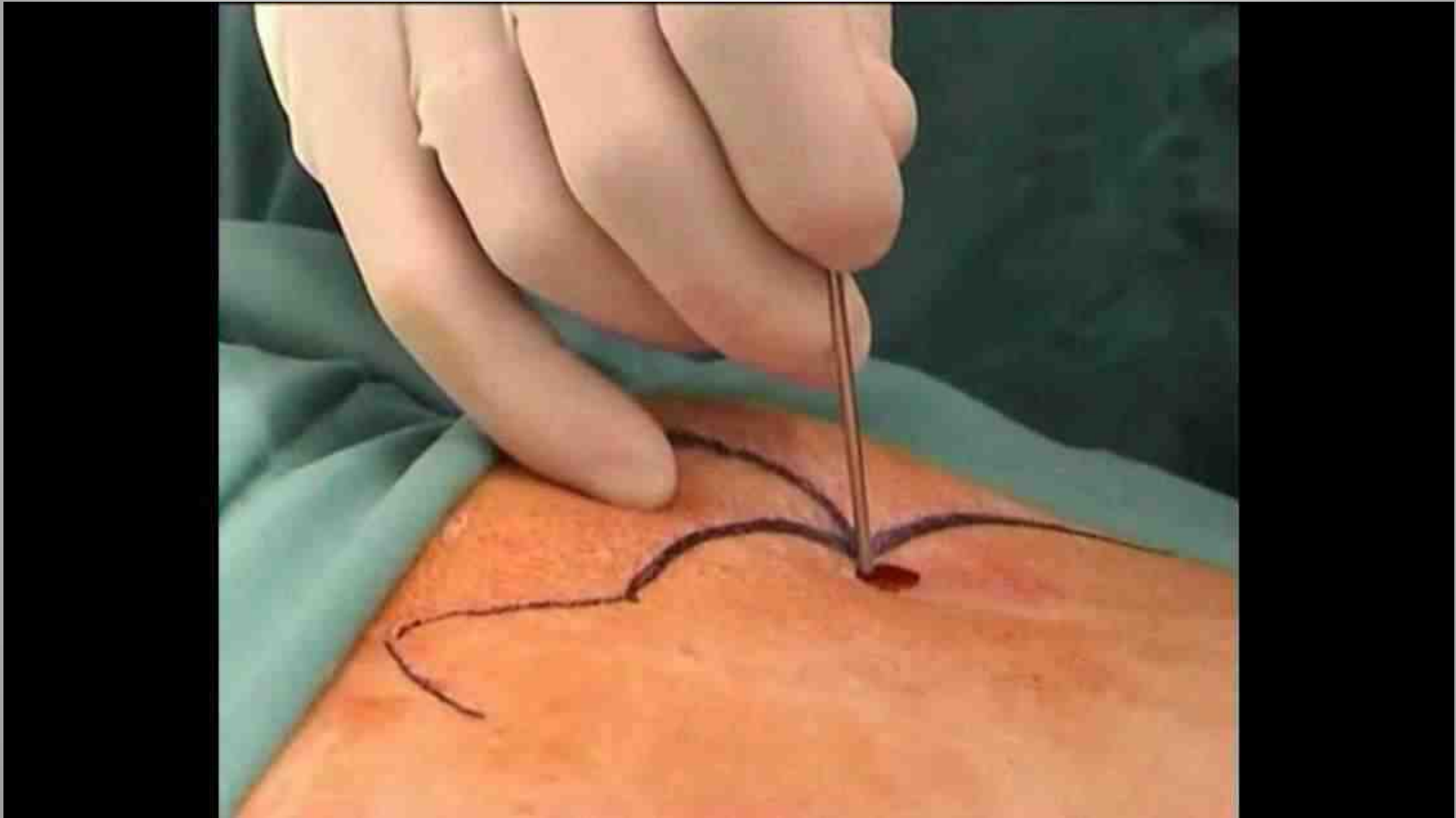


Palmer noktası (Sol Üst Kadran)

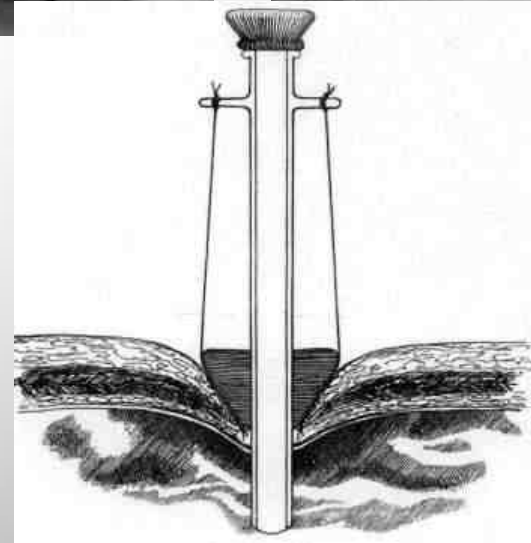
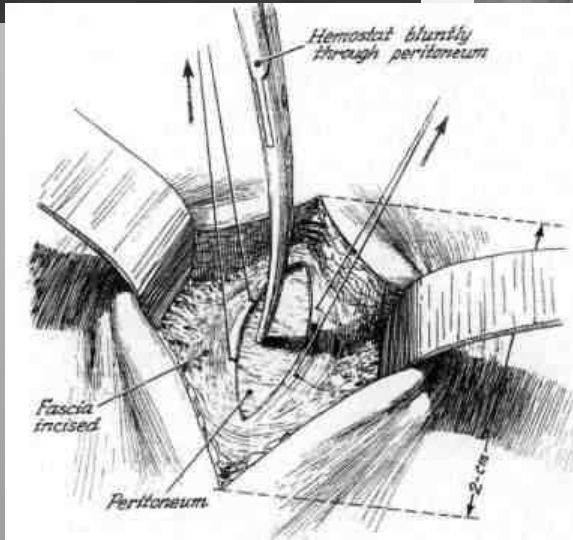
- Büyük damar yaralanma riski yok.
- Dalak / Mide Yaralanma riski
- Mid-klavikular hat; sol kostanın 4-5 cm altı (3 parmak)
- Veress cilde dik
- 3-5 mm trokar ile direkt

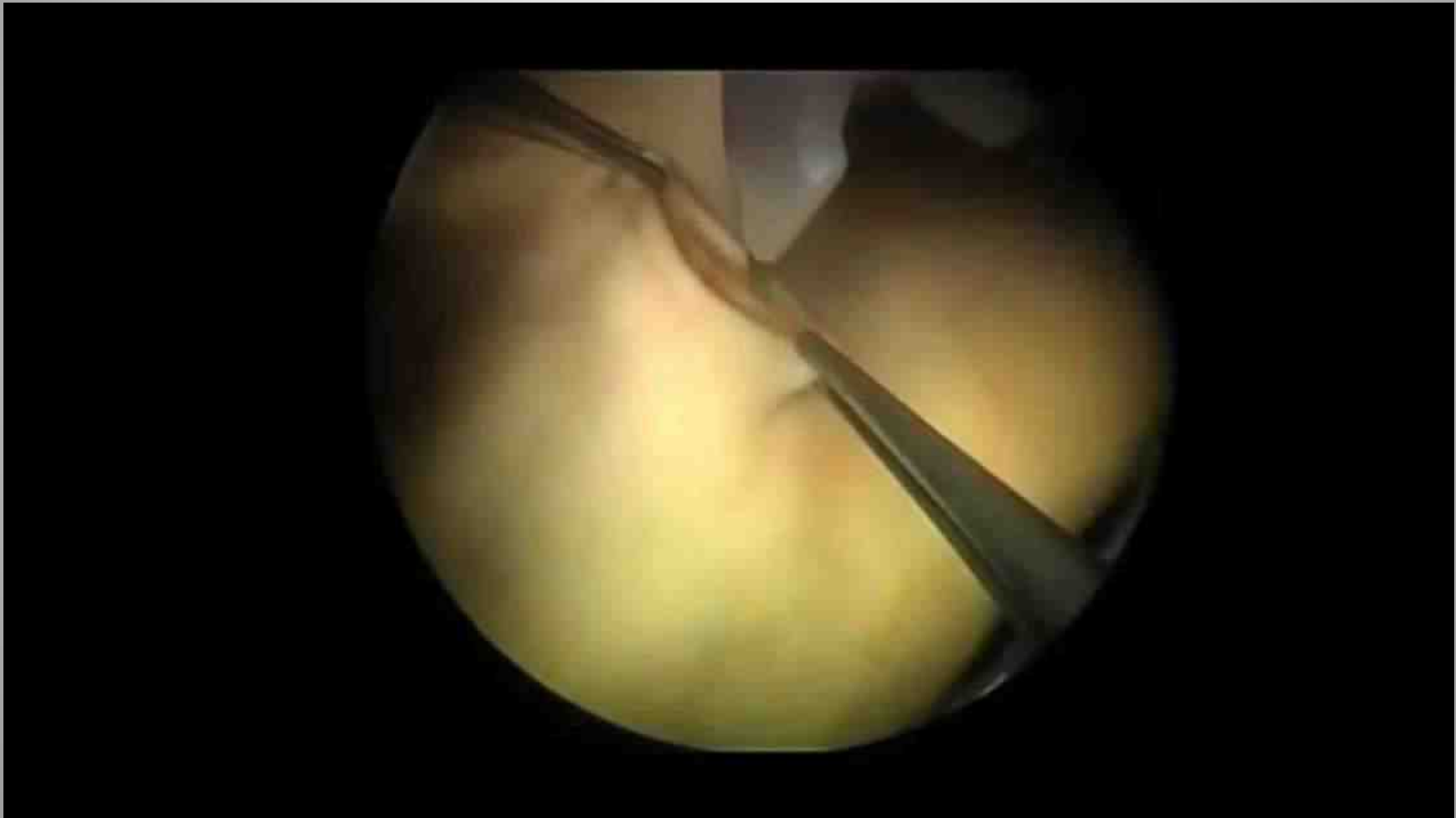






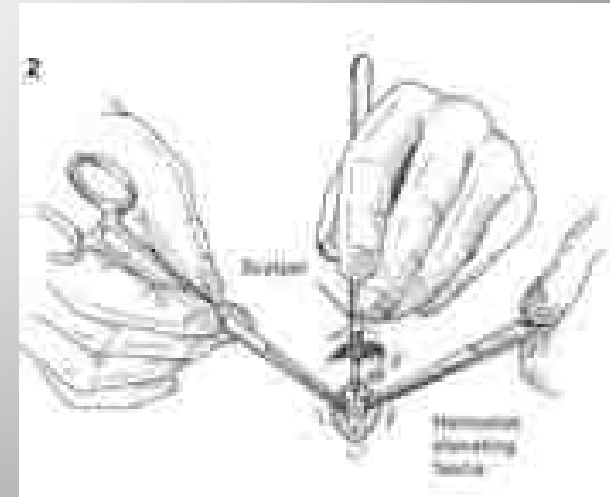
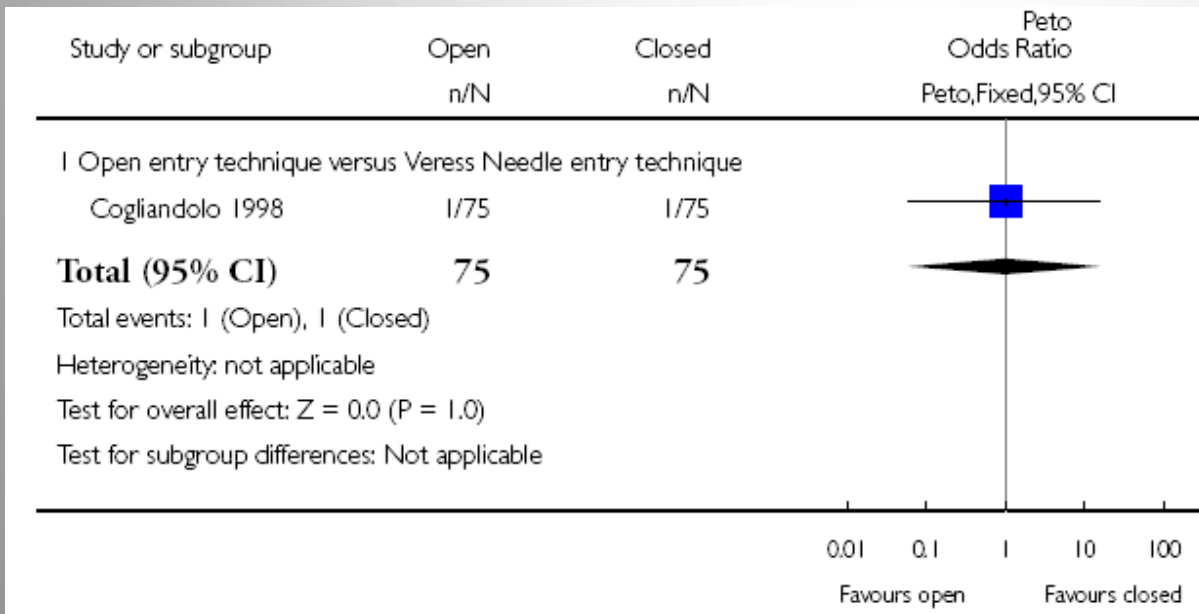
Açık Laparoskopisi (Hasson Tekniği)





Açık Laparoskopi (Hasson Tekniği)

- Barsak yaralanma riski var. Hatta fazla: 1 /1000 (RR:2,17)
- Damar yaralanma riski az



İnsuflasyon yapmadan Direkt Trokar yöntemi

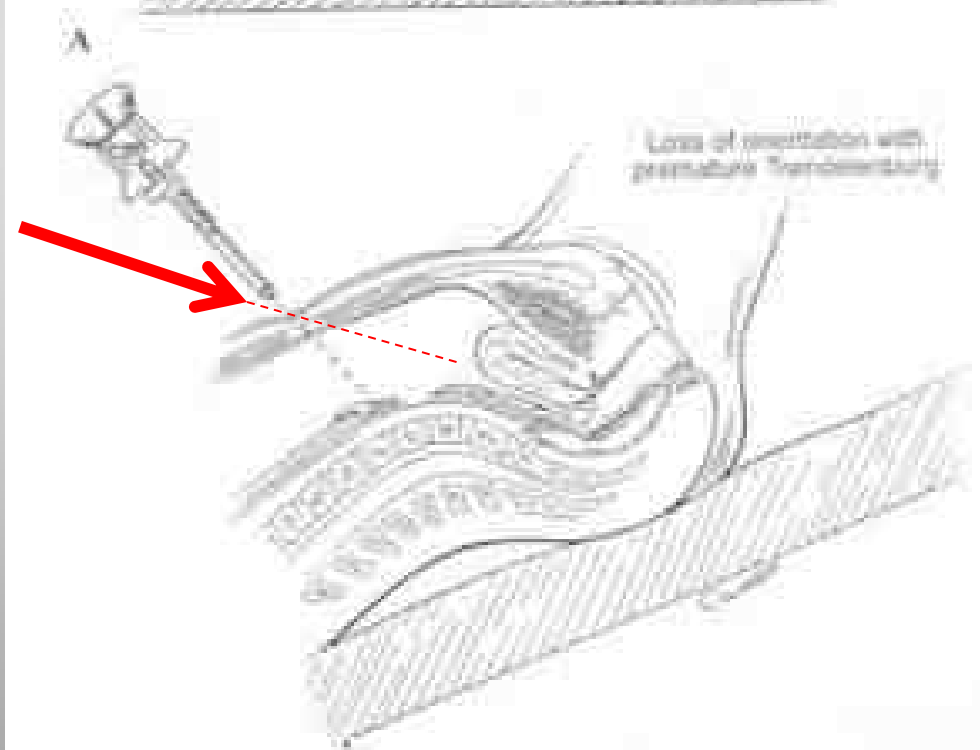
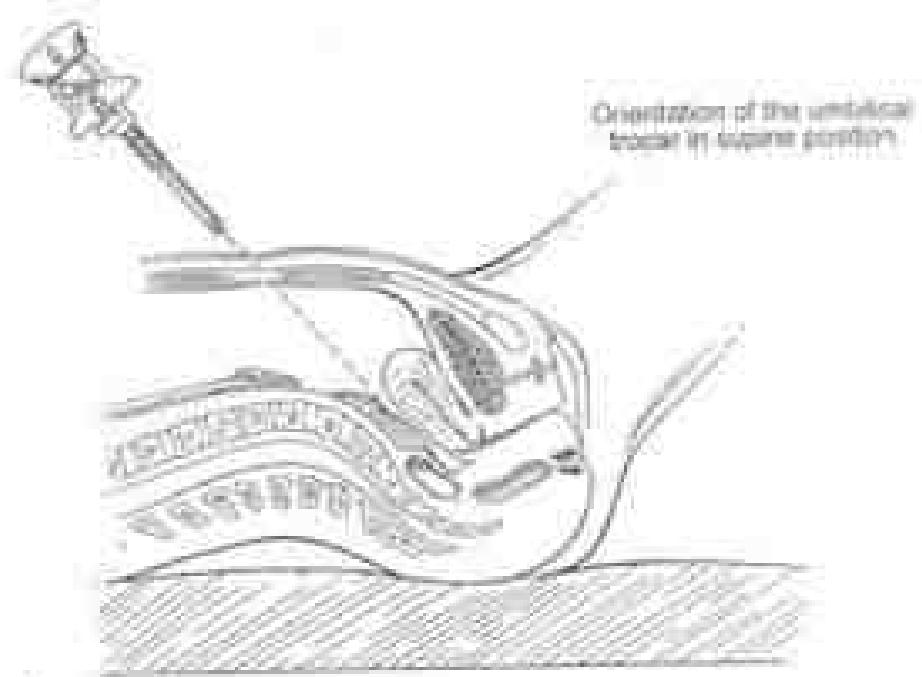
- İlk Dingefelder (1978) tanımlamıştır.



Direkt Trokar Tekniđi

- En hızlı teknik
- Trokar açısı (Vertikal - 45°)
- Trokar (5 – 10 mm)
- Ciddi Damar / Barsak yaralanma :
0,4 / 1000
- Preperitoneal infüslasyon, CO₂
embolizasyon riski az.



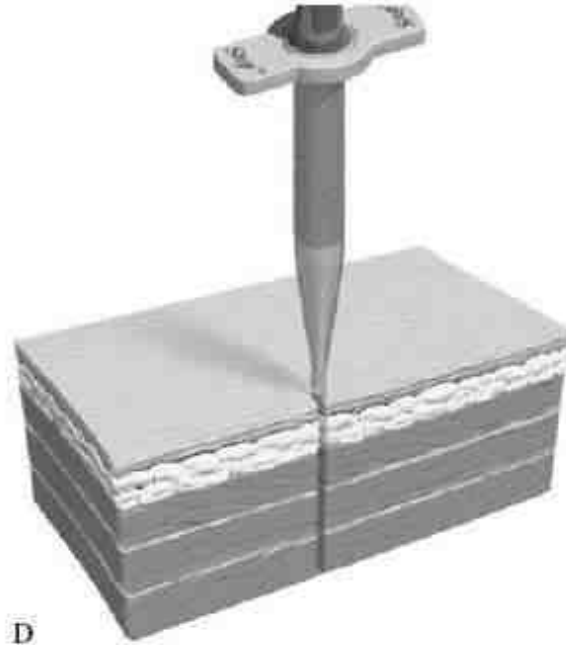
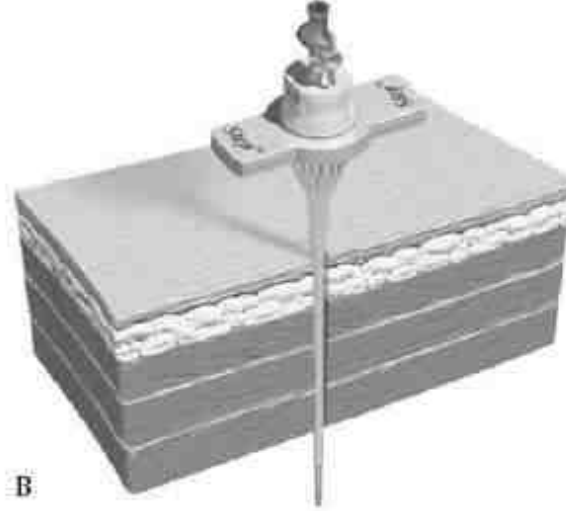


Direkt Trokar Tekniđi

Ciddi Damar / Barsak Yaralanması

Author	Year	Methods	Veress needle and blind trans-umbilical trocar (n. cases/n. procedures)	Direct trocar insertion (n. cases/n. procedures)
Borgatta	1990	Randomized controlled trial	0/110	1/102
Agresta	2004	Randomized controlled trial	4/323	0/275
Byron	1993	Randomized controlled trial	0/126	0/126
Dabirashrafi	1994	Randomized controlled trial	0/378	0/378
Nezhat	1991	Randomized controlled trial	0/100	0/100
Total			4/1037	1/981

RADIALLY EXPANDING TROCARS (RET)



- Künt trokar için daha fazla kuvvet gerekir.
- Geleneksel trokarlara üstünlüğü gösterilmemiştir.
- Künt uç organ yaralanmalarını önleyebilir.

DIRECT OPTICAL ACCESS TROCAR (DOA)



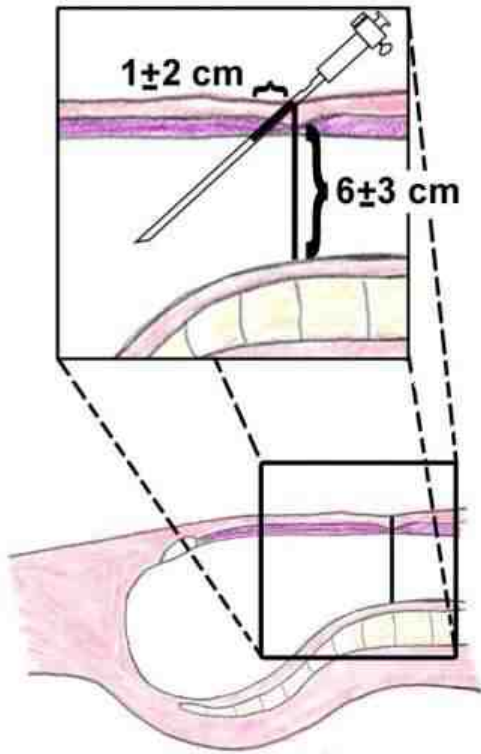
LAPAROSKOPI: ZOR HASTALAR

- Obez
- Zayıf
- Batın operasyonu geiren hasta
- Byk batın ii kitle
- Gebelik

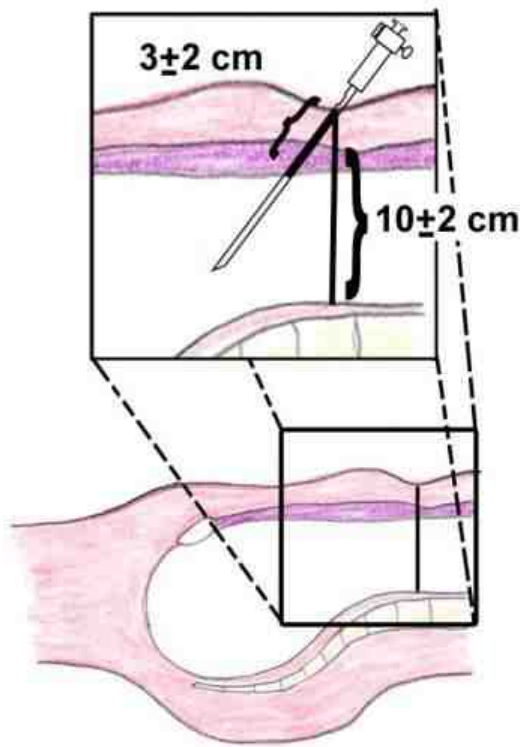


ZAYIF: AÇI DAR ŞİŞMAN : AÇI GENİŞ

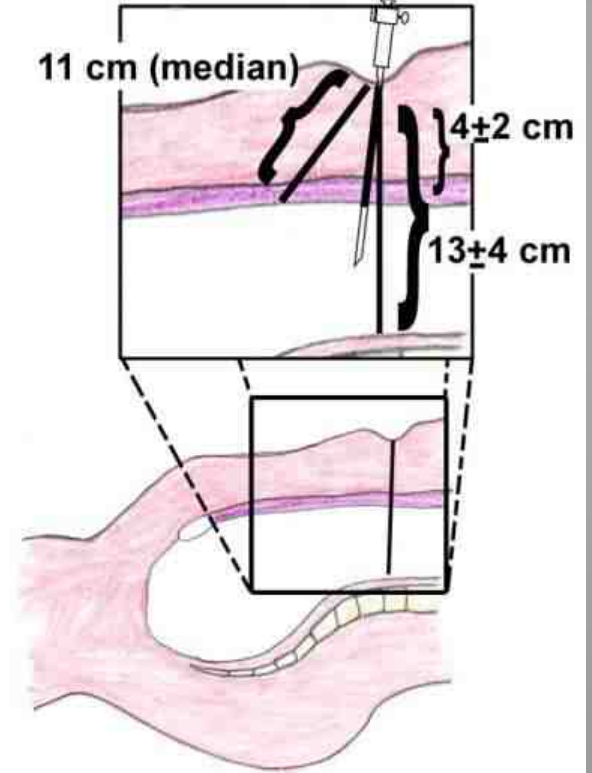
Non-obese



Overweight



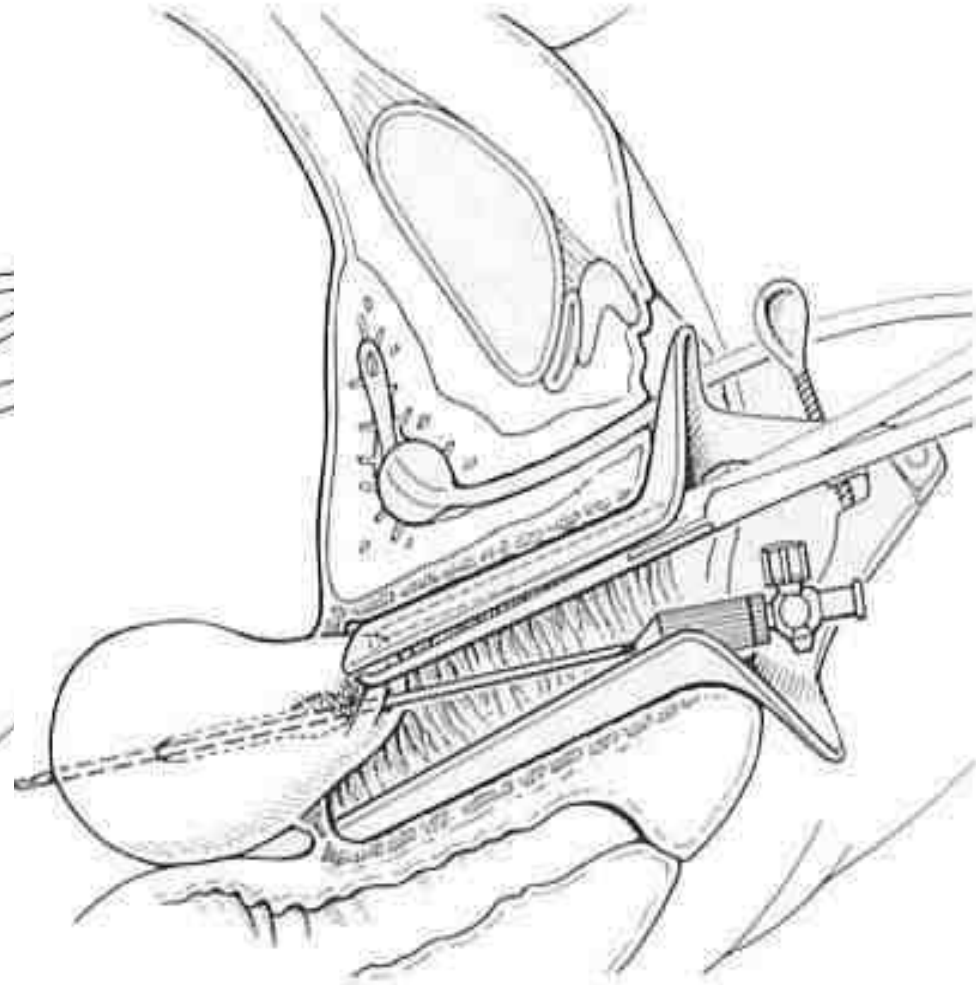
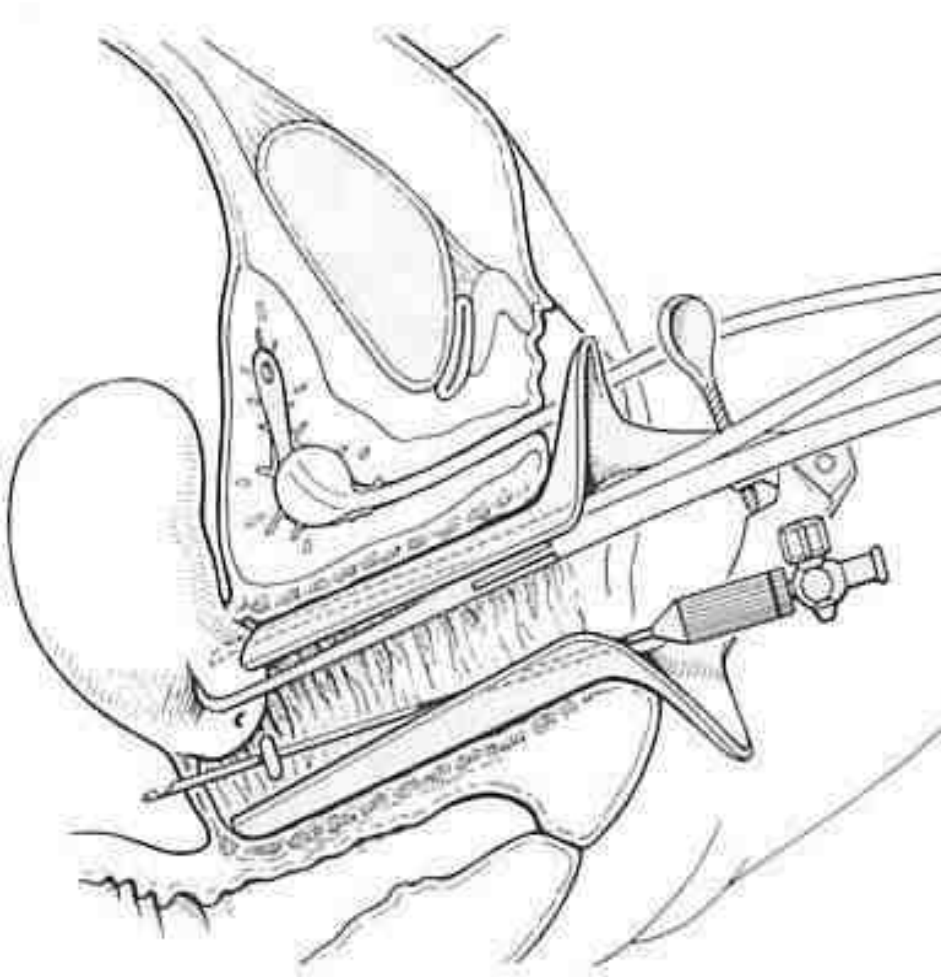
Obese



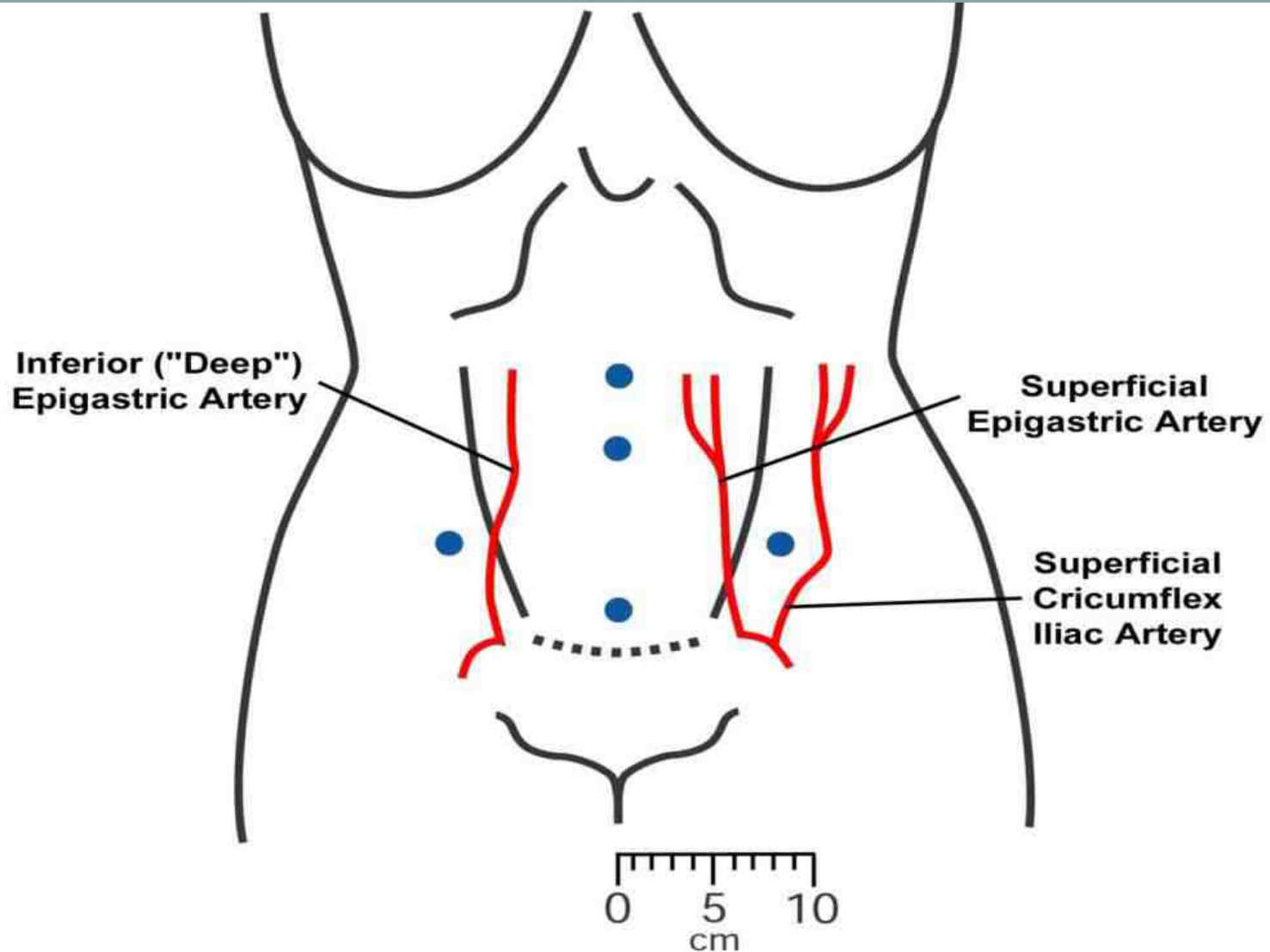
TRANSFUNDAL (Obez, BMI >25)

	Transfundal group	Infra-umbilical group
No. of subjects	50	50
Operating time (min) ^a	13 (6–25)	13 (7–35)
No. of Veress needle punctures		
1	48	44
2	2	5
Unsuccessful (twice)		1
Success rate (no. of punctures/artificial pneumoperitoneum)	53/51 (1.04)	56/49 (1.14)

TRANS CUL-DE-SAC & TRANSUTERIN



Sekonder Trokar İnsersiyonu



Laparoskopi Giriş Komplikasyonları

L/S Komplikasyonlarının % 30-50 si

Occurrence of vascular and bowel complications, whatever the technique used for laparoscopic insertion (studies of >5000 procedures for gynaecologic indications).

Author	Year	Number of cases	Methods	Bowel injury		Vascular injury	
Harki Sirren	1999	10,2812	Retrospective study	29	0.4/1000	6	0.1/1000
Dubuisson	1999	8324	Retrospective study	3	0.4/1000	6	0.7/1000
Chapron	1998	29,966	Retrospective study	14	0.5/1000	6	0.2/1000
Woolcott	1997	6173	Retrospective study	5	0.8/1000	0	0
Jansen	1997	25,764	Retrospective study	24	0.9/1000	47	1.8/1000
Wherry	1996	5215	Retrospective study	4	0.7/1000	0	0
O'Callaghan	1996	6417	Retrospective study	1	0.15/1000	1	0.15/1000
Querleu	1993	17,521	Retrospective/prospective study	7	0.4/1000	4	0.2/1000
Patel	1985	8600	Retrospective study	1	0.1/1000	0	0
Penfield	1984	10,840	Retrospective study	6	0.5/1000	0	0
Phillips	1984	125,162	Retrospective study	53	0.4/1000	56	0.4/1000
Mintz	1977	99,204	Retrospective study	31	0.3/1000	43	0.4/1000
Total	-	523,602	-	287	0.5/1000	205	0.4/1000

Damar yaralanmaları



**Veressten kan geldiyse
Batında serbest kan
görüldüyse**

Damar yaralanmaları

- Genel insidans %0.04-0.5
- Mortalite oranı %9–17
- Veress ve Primer trokar yerleştirilmesi sırasında

Aorta

Common iliac

Inferior vena cava

İnternal ve external iliac vessels

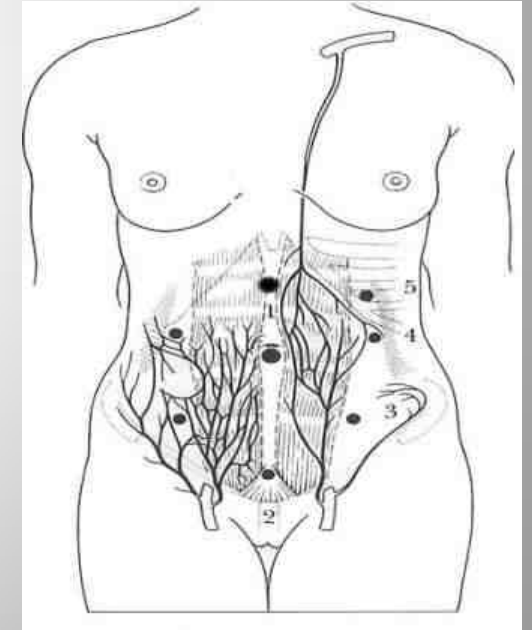
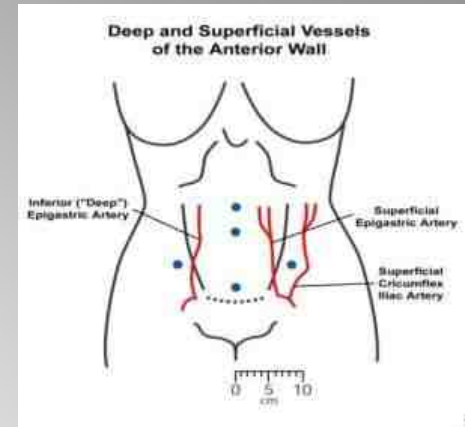
- Sekonder trokar yerleştirilmesi sırasında:

Superficial epigastric

Superficial circumflex,

Inferior epigastric

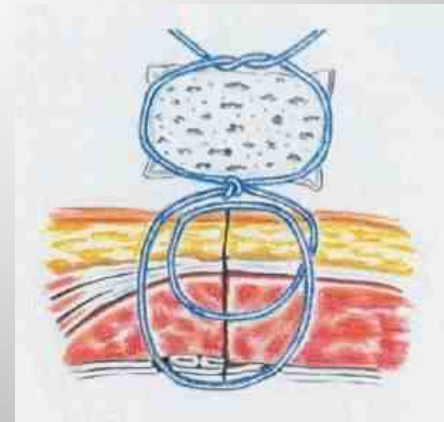
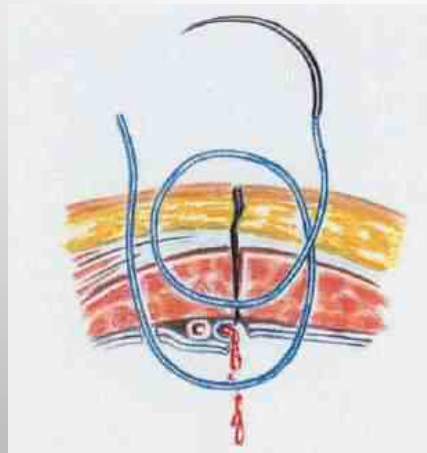
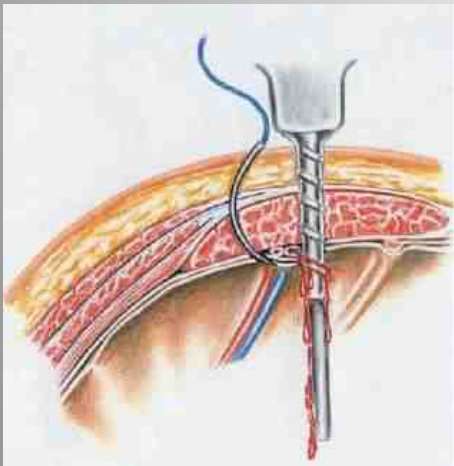
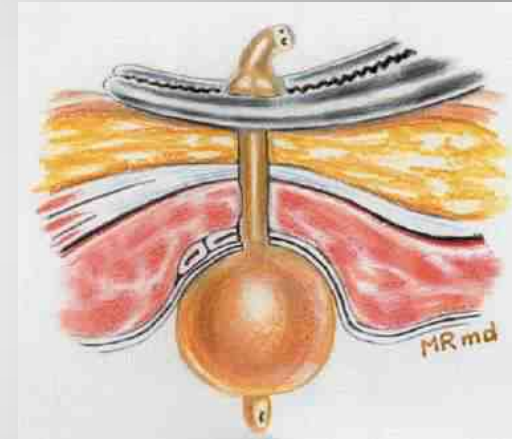
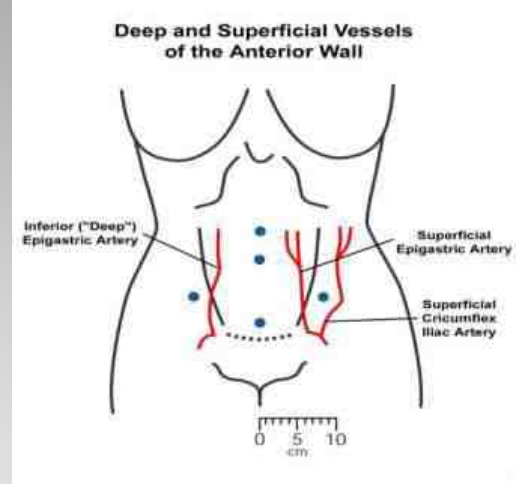
Deep circumflex vessels

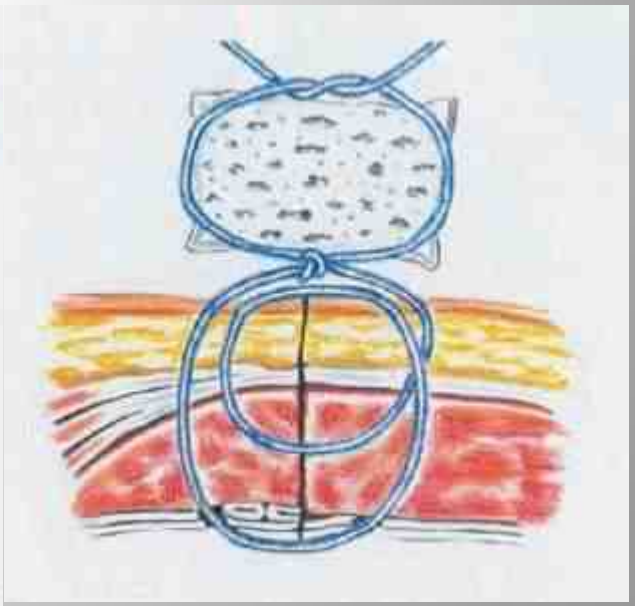
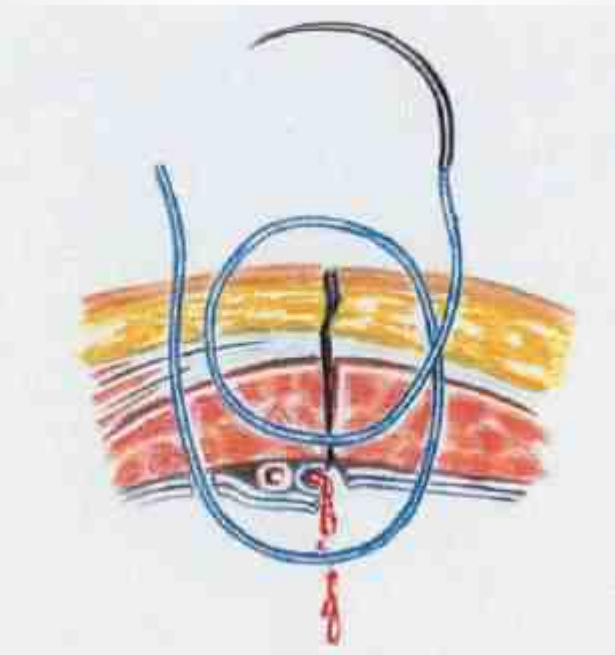
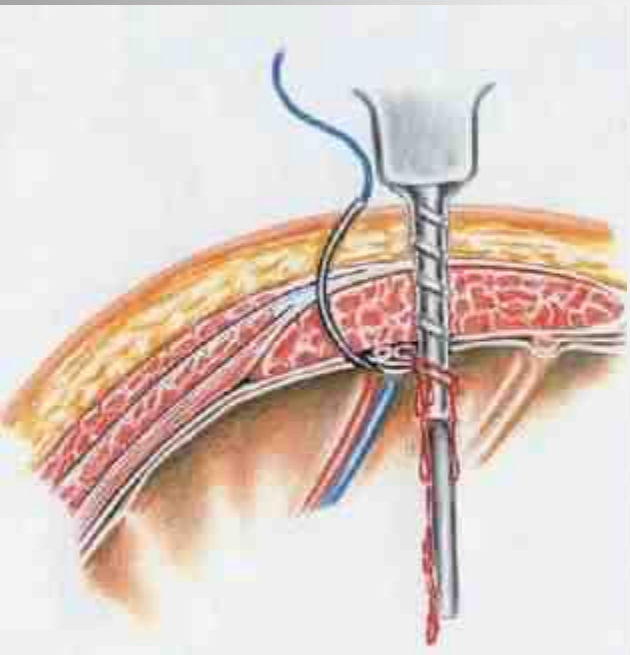
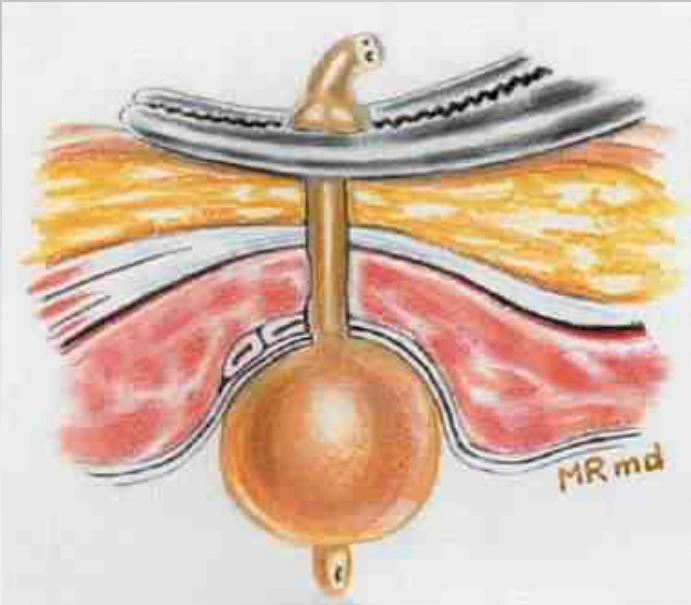




Inferior epigastric arter

- Kompresyon
- Koter
- Foley kateter
- Tam kat suture





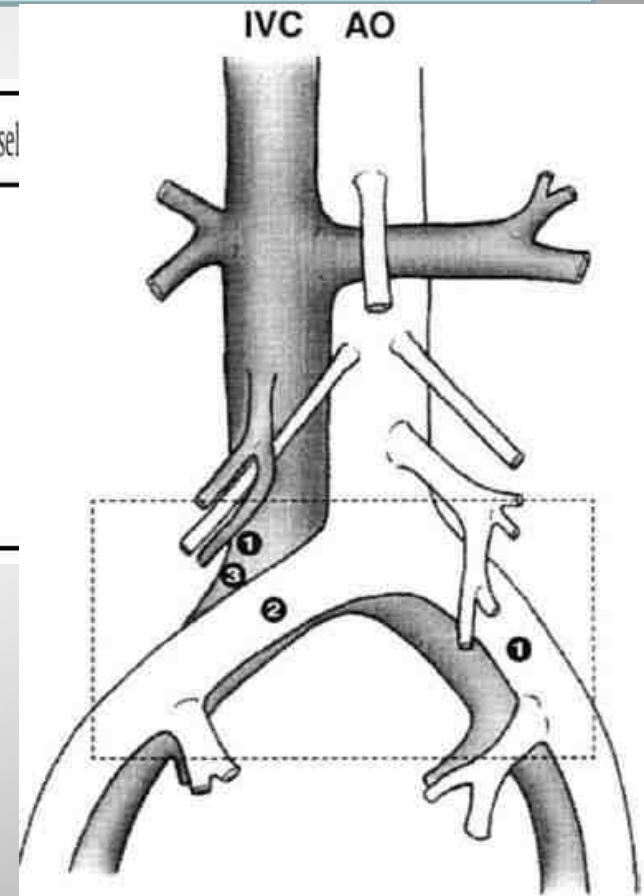




Laparoskopi Giriş Komplikasyonları

DAMAR YARALANMASI

Author	Year	Vascular injuries (n)	Aorta	Inferior vena cava	Iliac artery	Iliac vein	Mesenteric vessel
Chapron	2000	19	5	6	8	3	3
Fuller	2005	25	11	3	4	1	3
Chandler	2001	271	37	25	106	51	52
Soderstrom	1997	47	6	5	30	0	4
Total	-	362	59 (16%)	39 (11%)	158 (41%)	55 (15%)	62 (17%)



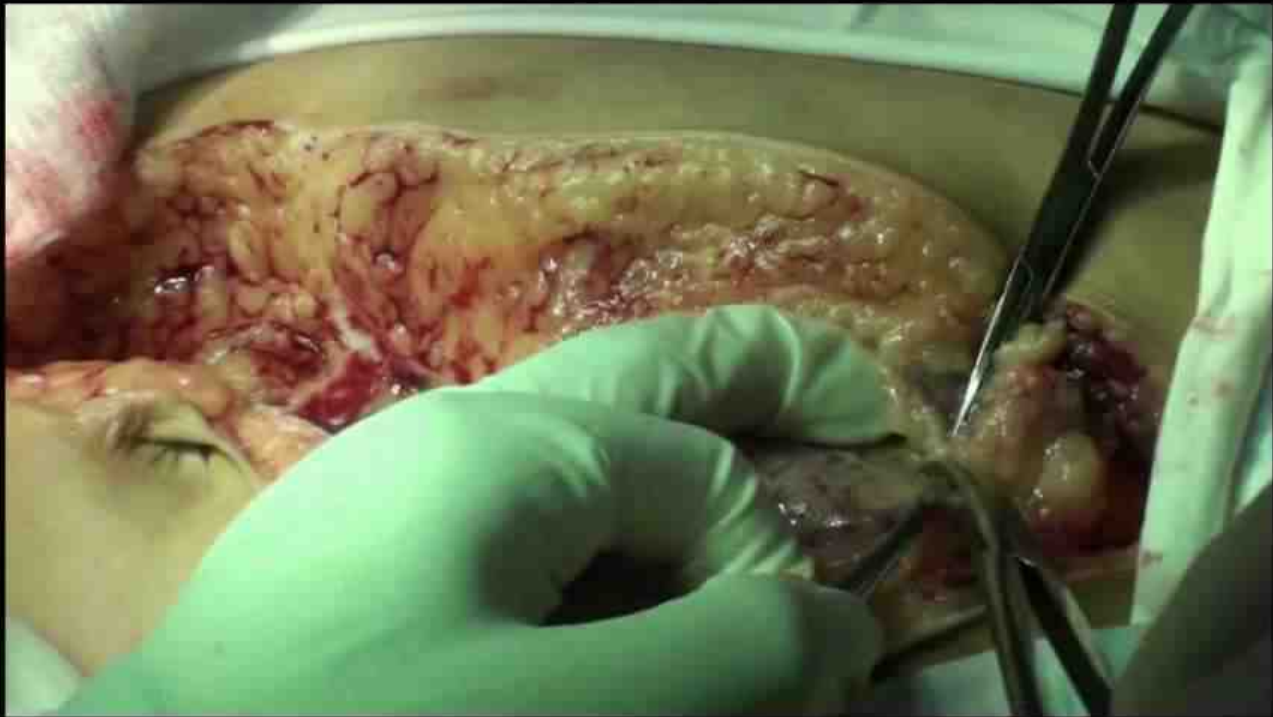
Laparoskopi Giriş Komplikasyonları

DAMAR YARALANMASI (TEKNİĞE GÖRE)

Author	Year	Methods	Veress needle and trans-umbilical blind trocar	Open	Direct trocar insertion
Ostrzenski	1999	Prospective study	0/200	-	-
Decloedt	1997	Prospective study	-	0/90	-
Hasson	2000	Retrospective study	-	0/5284	-
Cravello	2002	Retrospective study	-	0/1562	-
Yerdel	1999	Randomized controlled trial	1/470	-	0/1030
Querleu	1993	Retrospective study	4/17,521	-	-
Agresta	2004	Randomized controlled trial	0/323	-	0/275
Tinelli	2009	Randomized controlled trial	0/101	-	0/93
Jansen	2004	Retrospective study	25/51,559	1/579	-
Le Tohic	2007	Retrospective study	-	-	0/1258
Nezhat	1991	Randomized controlled trial	0/100	-	0/100
Molloy	2002	Meta-analysis	8/132.851 (0.06/1000)	1/21.292 (0.05/1000)	0/16.739 (0/1000)

Damar yaralanmaları - SAAS

- **Stop** the arterial bleeder immediately by occluding the vessel
- **Alert** the team so that resuscitation measures (intravenous access, blood cross-matching, volume replacement and blood transfusion)
- **Access** the bleeding site by the quickest and safest route
- **Secure** the vascular injury by using an appropriate haemostatic method



Physicians Insurers Association of America (n: 292)
 Entry-injury Medical Device Reports to the US FDA (n: 282)

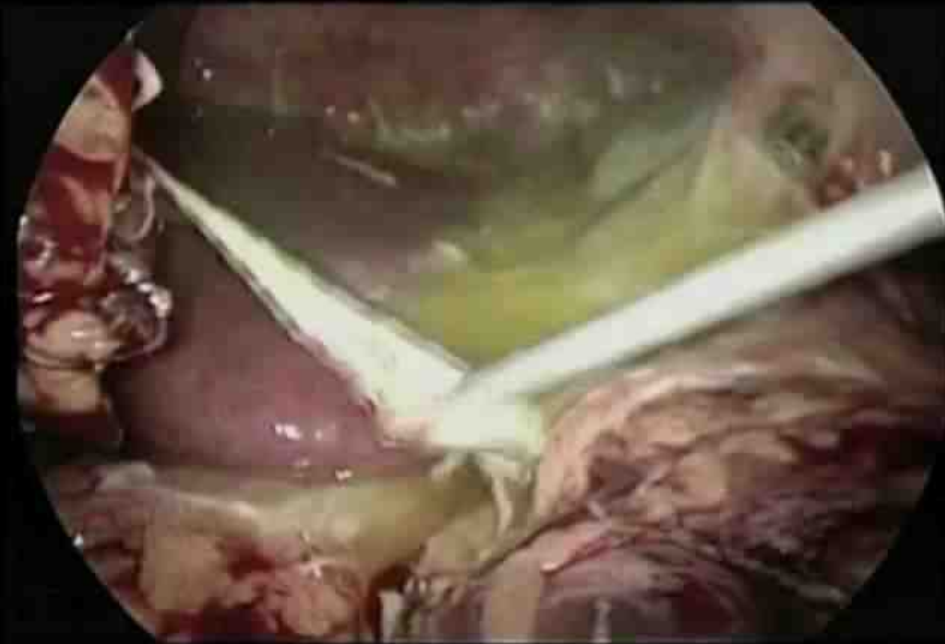
Organ or structure	n	%
Small bowel	146	25.4
Iliac artery	106	18.5
Colon	70	12.2
Iliac or other retroperitoneal vein	51	8.9
Mesenteric vessel secondary branches and tributaries	42	7.3
Aorta	37	6.4
Inferior vena cava	25	4.4
Abdominal wall vessels	22	3.8
Urinary bladder	19	3.3
Liver	13	2.3
Major visceral vessel	10	1.7
Stomach	9	1.6
Other	24	4.2
Total	574	100.0

Laparoskopi Giriş Komplikasyonları

BARSAK YARALANMASI (TEKNİĞE GÖRE)

Author	Year	Methods	Veress needle and blind trans-umbilical trocar	Open	Direct trocar insertion
Ostrzenski	1999	Prospective study	0/200		
Decloedt	1997	Prospective study	-	1/90	-
Hasson	2000	Retrospective study	-	1/5284	-
Cravello	2002	Retrospective study	-	2/1562	-
Yerdel	1999	Randomized controlled trial	1/470	-	0/1030
Querleu	1993	Retrospective study	7/17,521	-	-
Agresta	2004	Randomized controlled trial	4/323	-	0/275
Tinelli	2009	Randomized controlled trial	2/101	-	0/93
Jansen	2004	Retrospective study	21/51,559	3/579	-
Le Tohic	2007	Retrospective study	-	-	0/1258
Nezhat	1991	Randomized controlled trial	0/100	-	0/100
Molloy	2002	Meta-analysis	49/134.917 (0.4/1000)	23/21.547 (1.1/1000)	9/16.739 (0.5/1000)





İntestinal yaralanmalar

- İnsidans

Tanısal L/S: %0.06- 0.5

Operatif L/S: %0.3–0.5

İntestinal yaralanmalardan
dolayı mortalite %3.6

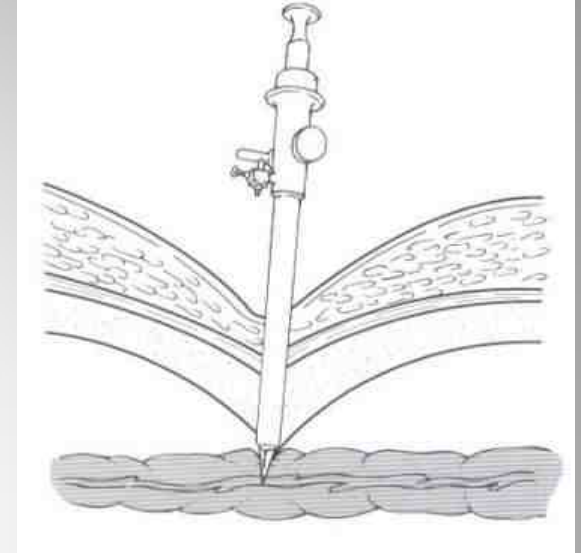
İnce barsaklar %58, kolon %32 ve mide
%8

**Veress ve
trokar giriş
bölgesini
eksplere et !!!!**

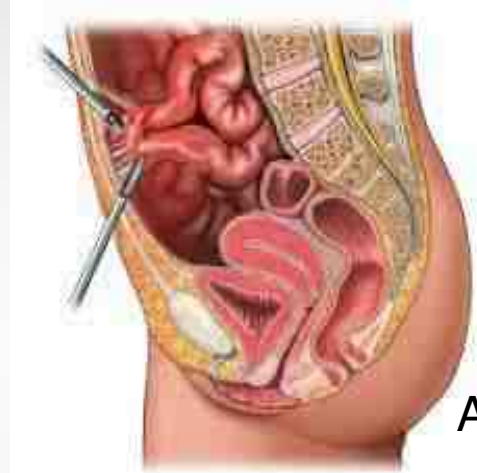
**NG unutmama –
mideyi boşalt
!!!!!!**

İntestinal yaralanmalar

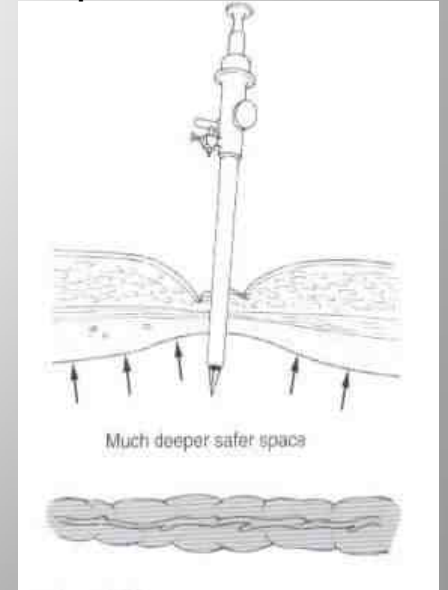
Abdominal pressure= 8mmHg



- Veress giriři
- Trokar giriři
- Cerrahi sırasında
- Elektrokoterle termal hasar
- Port yerinden herniasyon



Abdominal pressure=25mmHg



Laparoskopi Giriş Komplikasyonları

BARSAK YARALANMASI (TEKNİĞE GÖRE)

Author	Year	Methods	Veress needle and blind trans-umbilical trocar	Open	Direct trocar insertion
Ostrzenski	1999	Prospective study	0/200		
Decloedt	1997	Prospective study	-	1/90	-
Hasson	2000	Retrospective study	-	1/5284	-
Cravello	2002	Retrospective study	-	2/1562	-
Yerdel	1999	Randomized controlled trial	1/470	-	0/1030
Querleu	1993	Retrospective study	7/17,521	-	-
Agresta	2004	Randomized controlled trial	4/323	-	0/275
Tinelli	2009	Randomized controlled trial	2/101	-	0/93
Jansen	2004	Retrospective study	21/51,559	3/579	-
Le Tohic	2007	Retrospective study	-	-	0/1258
Nezhat	1991	Randomized controlled trial	0/100	-	0/100
Molloy	2002	Meta-analysis	49/134,917 (0.4/1000)	23/21,547 (1.1/1000)	9/16,739 (0.5/1000)

Intestinal yaralanmalar

Measures which may help reduce intestinal injuries.

- Routine inspection of the bowel below the entry site
- Minimise bowel handling
- Use atraumatic grasping forceps for bowel handling
- Careful tissue dissection
- Manipulate and dissect under vision
- Limit adhesiolysis to clinically indicated cases only
- Regular inspection of the bowel after removal and reinsertion through the secondary port(s) to ensure that bowel loops are not inadvertently picked up and hung over the instruments
- Limit the use of thermal energy when working close to or on bowel wall
- Periodic checking of laparoscopic instruments for insulation failure



Intestinal yaralanmalar

Possible reasons leading to delayed diagnosis of bowel injuries.

- Injury outside the operating field caused by bowel retraction or handling with sharp instruments
- Unrecognized injury on entry or during closure of port sites
- Thermal injury with subsequent bowel wall necrosis and breakdown
- Postoperative abscess with subsequent fistula formation
- Herniation through port sites
- Postoperative narcotic medications masking pain
- Atypical presentation of patients with laparoscopic bowel injury due to different inflammatory and immunological response⁵²
- Clinician denial

İntestinal yaralanmalar



İntraoperatif erken tanı
Hemen onar
Lavaj- Parenteral
antibiyotik
Kolorektal
konsültasyon

- **Postop tanı**
- **IV hidrasyon**
- **Nazogastrik dekompresyon**
- **Parenteral antibiyotik**
- **Radyolojik inceleme**
- **Multidisipliner yaklaşım**
- **Eksplorasyon**

Üriner sistem yaralanmaları

- Genel insidans %0.05-8.3
- Mesane yaralanmaları 0.02–8.3%
- Üreteral yaralanmalar 0.5–3%

Üriner sistem yaralanmaları

- Suprapubik trokar yerleştirilirken
- Mesane diseksiyonu sırasında
- Endometriozis eksizyonu
- Pelvik kitlelerin eksizyonu
- Pelvik anatominin bozulmasına neden olan adezyonlar
- Termal hasar

Üriner sistem yaralanmaları- riskin azaltılması

- İşlem öncesi mesanenin boşaltılması
- Anatominin iyi bilinmesi ve sistematik üreter diseksiyonu
- Üreter diseksiyonu sırasında devaskülarizasyondan kaçınılması
- Sistoskopi
- Üreteri laterale itmek için hidrodiseksiyon
- Üreteral katater yada stent

Mesane hasarı

- Şüphe varsa kontrol et
- Metilen mavisi, sistoskopi
- Absorbable polydiaxanone veya vicryl ile bir yada iki tabaka onar
- 7-10 gün mesane kateterizasyonu

Termal komplikasyonlar



- Aktif elektrot travması
- Akım sapması
- Diğer toprak bölgesi yanıkları
- İnsulasyon defektleri
- Direkt bağlantı
- Kapasitif bağlantı

Trokar bölge hernisi

- İnsidans %1,
≥10 mm trokar kullanımı,
uzun prosedür,
aşırı manuplasyon riski arttırır.
- >5 mm olan kesilerde fasya kapatılması oluşmasını önler.

Sinir yaralanmaları

Mechanism of nerve injury and resulting post-operative clinical manifestation.

Nerve	Common mechanism of injury	Clinical manifestation
Femoral	Prolonged hip flexion, abduction, and external rotation Compression by retraction Direct injury	Impaired abduction and outward rotation of the hip Impaired extension of the knee Loss of patellar reflex Paresthesia over the anterior and medial thigh Paresthesia over the medial aspect of the calf
Lateral femoral cutaneous	Prolonged hip flexion, abduction, and external rotation Compression by retraction Direct injury	Paresthesia and pain in the proximal lateral thigh (meralgia paresthetica)
Genitofemoral	Direct injury during pelvic lymphadenectomy or removal of a pelvic sidewall mass	Paresthesia of the ipsilateral mons, labia majorum, and skin overlying the femoral triangle
Obturator	Prolonged hip flexion and abduction Direct injury during retroperitoneal dissection or paravaginal repair	Sensory loss in the upper medial thigh Impaired external hip rotation
Sciatic	Prolonged extension of the hip and flexion of the knee Direct injury during extensive laparoscopic pelvic floor repair or during hemostasis	loss of sensation over the calf and on the dorsum, sole, and lateral side of the foot Inability to flex the knee Drop foot
Iliohypogastric & ilioinguinal	Direct injury by extended Pfannensteil incision or Maylard incisions and nerve entrapment during suturing	Pain and anesthesia over the pubis, labia or thigh

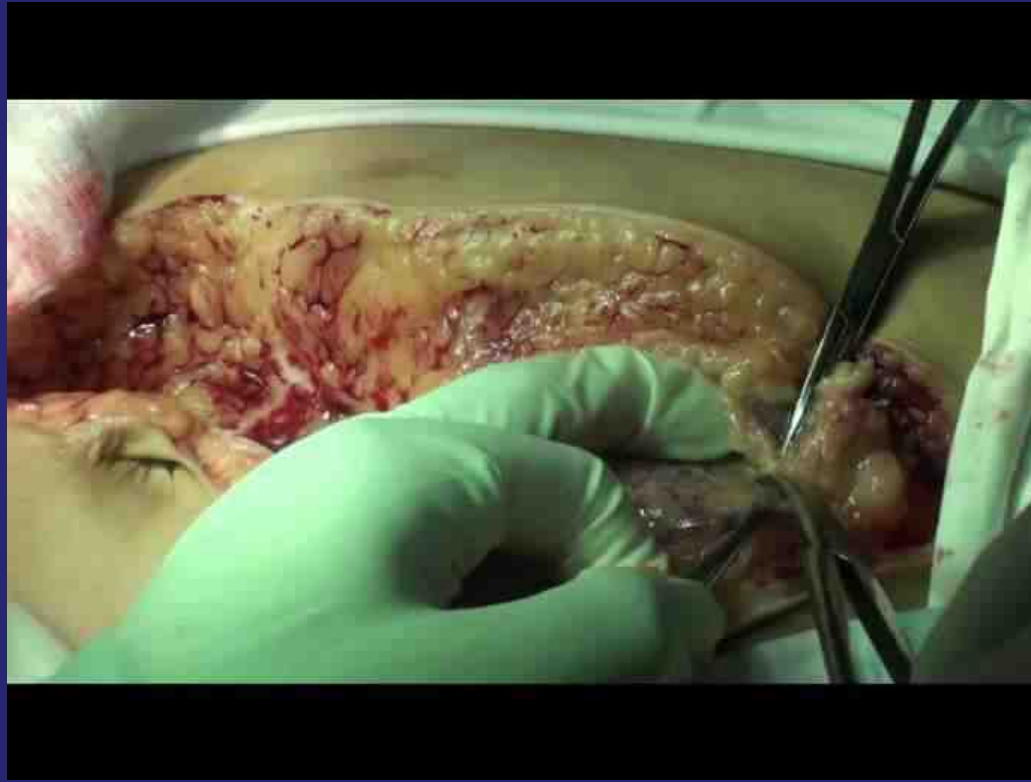


**İYİ
ANESTEZİST**

**DENEYİMLİ
CERRAH**

**DENEYİMLİ
YARDIMCI
PERSONEL**

İYİ ASİSTANS



- En iyi bildiğiniz yöntemi uygulayınız
- Her operasyonunuzu ilk operasyonunuz gibi yapın
- Laparoskopi aletlerini kontrol edin
- Zor olgularda alternatif yöntemleri deneyin (Palmer noktası girişi gibi)
- Olguları postop. dönemde dikkatli takip edin



Royal College of
Obstetricians and
Gynaecologists

Setting standards to improve women's health

Green-top Guideline
No. 49
May 2008

PREVENTING ENTRY-RELATED GYNAECOLOGICAL LAPAROSCOPIC INJURIES

SOGC CLINICAL PRACTICE GUIDELINE

No. 193, May 2007

Laparoscopic Entry: A Review of Techniques, Technologies, and Complications



THE COCHRANE
COLLABORATION®

Laparoscopic entry techniques (Review)

Ahmad G, O'Flynn H, Duffy JMN, Phillips K, Watson A

Review

Risks associated with laparoscopic entry: guidelines for clinical practice from the French College of Gynaecologists and Obstetricians

Xavier Deffieux^{a,*}, Marcos Ballester^b, Pierre Collinet^c, Arnaud Fauconnier^d, Fabrice Pierre^e



Sonuç

Practice points

- Major complications during laparoscopy are rare but can be catastrophic.
- Prevention of such laparoscopic injuries can be maximised by careful appropriate laparoscopic surgical training, patient selection, greater understanding of anatomy and energy sources available to the surgeon, planning of surgery and building a regular and committed team which includes not only the anaesthetist, but also theatre practitioners (scrub nurse, surgical assistant and theatre runner). Most importantly, communication between the surgeon and the team intra-operatively is paramount.
- Predetermined systematic plans of action must be in place in the event that a complication occurs during laparoscopy. Systematic drills to deal with for example a major vascular injury should be regularly rehearsed in an animal laboratory environment in order to maintain team skills.
- Most vascular injuries occur during the laparoscopic entry phase before the introduction of the primary port.
- While Veres needles and primary trocar entries are the most common causes of major vascular injuries, vessel lacerations have also been reported with the Hasson open entry and direct entry techniques.
- Mortality from laparoscopic-induced bowel injury is as high as 3.6%.
- Laparoscopic urinary tract injuries range from 0.05% to 8.3%. Bladder trauma occurs more frequently than ureteric and is more readily recognised at the time of injury.
- Nerve injuries are rare in laparoscopic surgery.

Conflict of Interest

Bu videoların hiçbirisi
ile ilgim yoktur.
Hepsi Youtube dan
alınmıştır.

Tesekkürler...