



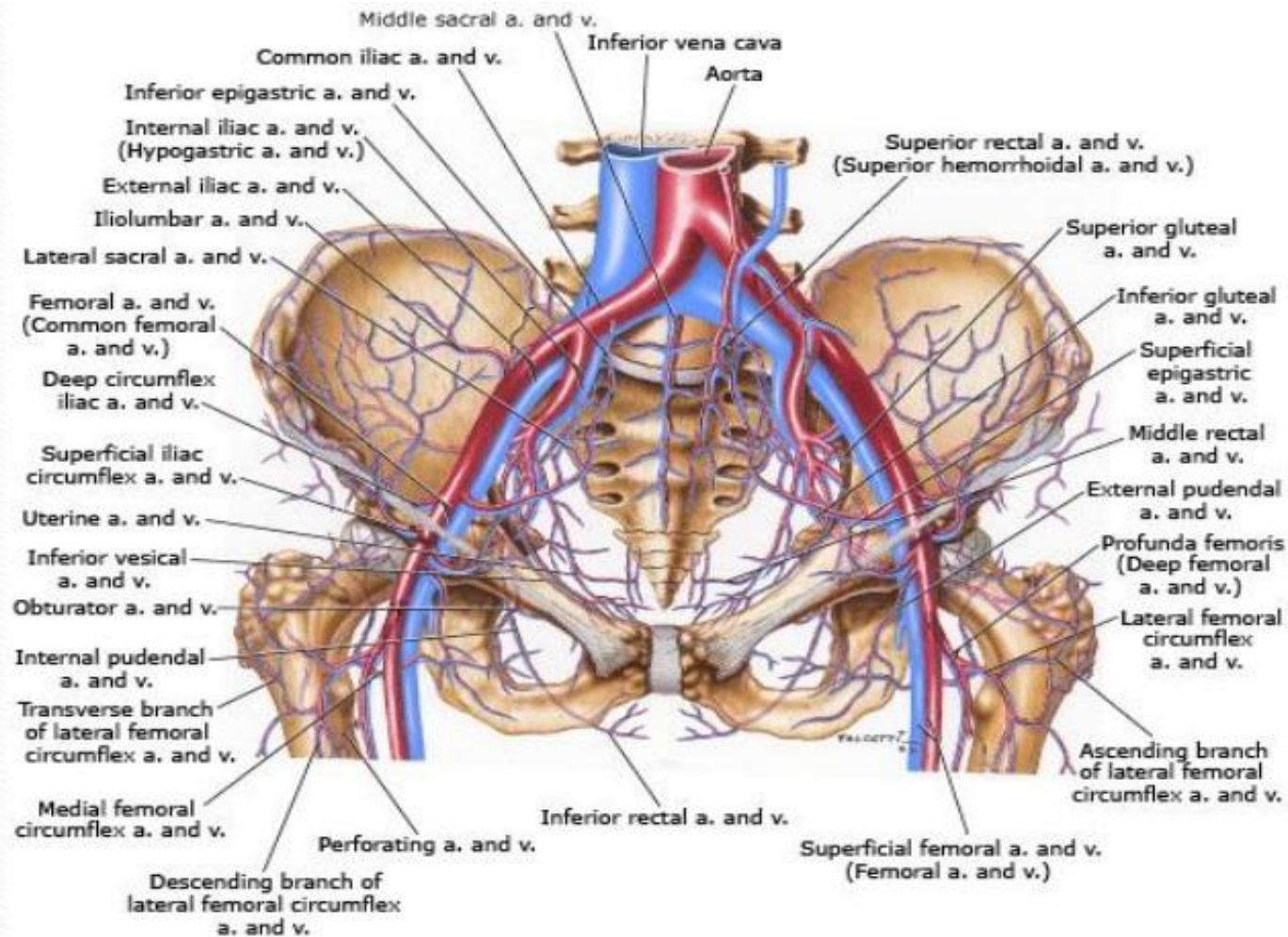
# Pelvik Travmalarda Endovasküler Embolizasyon

DR. OKAN YILDIRIM  
TURGUT ÖZAL TIP MERKEZİ RADYOLOJİ ABD.

- Major pelvik kırıklar künt travmalı hastaların % 4-9'unda görülür
- Major pelvik travmalarda mortalite %46' a kadar ulaşmaktadır
- Mortalite, hastaların% 42'sinde devam eden pelvik kanama nedeniyle oluşur.

- Kanamaların çoğu venöz sadece %5' inde arteriyel orjin var
- Arteriyel orjinli olanların %60'ında pelvik halka kırığı mevcut
- Ayrıca sıvı resüsitasyonuna cevap vermeyen pelvik kırıklı hastaların% 70'inde pelvik arter kanaması bulunur

# anatom

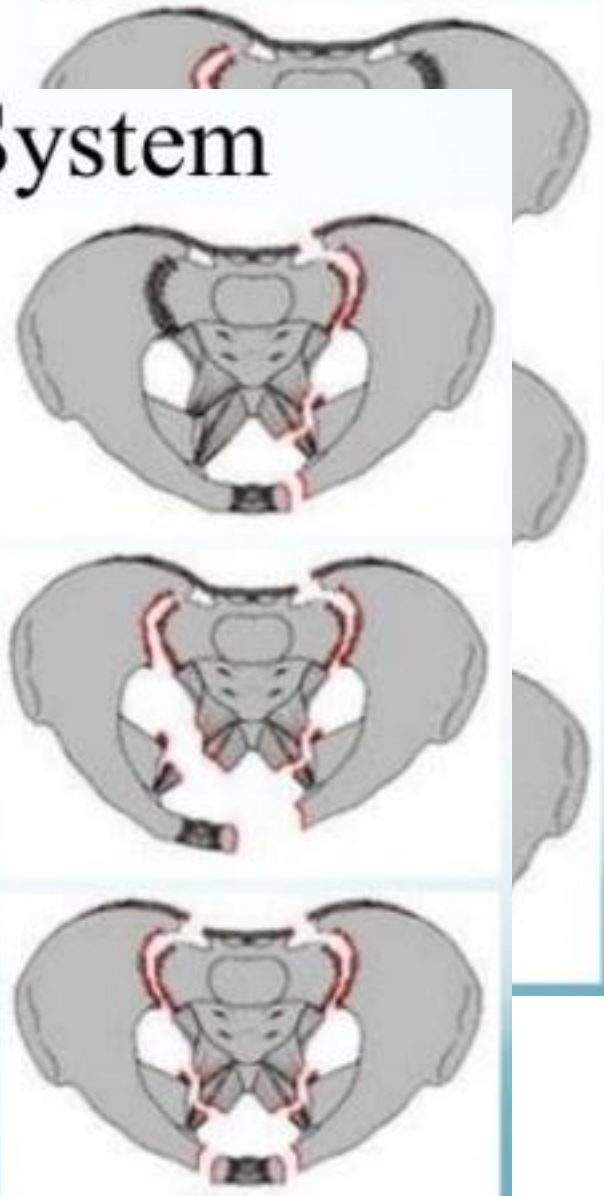


# Tile Classification System

## Tile Classification System

Type C: *Unstable*  
pelvis: complete  
disruption of posterior  
structures

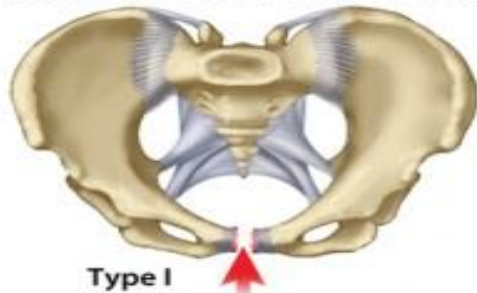
- C1: unilateral
- C2: bilateral w/ one side  
Type B, one side Type C
- C3: bilateral Type C



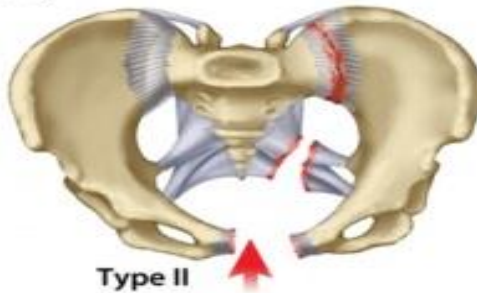


# Young sınıflandırması

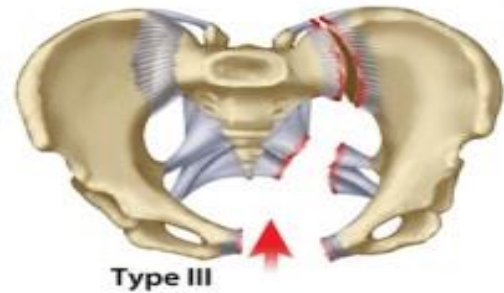
## Anterior Posterior Compression (APC)



Type I



Type II



Type III

## Lateral Compression (LC)



Type I

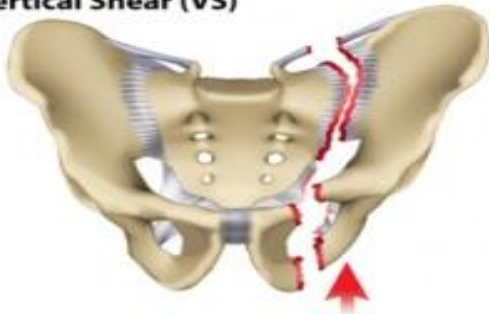


Type II



Type III

## Vertical Shear (VS)



## Comparing the predictive value of the pelvic ring injury classification systems by Tile and by Young and Burgess



Georg Osterhoff\*, Max J. Scheyerer, Yannick Fritz, Samy Bouaicha, Guido A. Wanner, Hans-Peter Simmen, Clément M.L. Werner

Division of Trauma Surgery, University Hospital Zurich, Switzerland

**Patients and methods:** Two-hundred-and-eighty-five consecutive patients with pelvic ring fractures were analyzed for mortality within 30 days after admission, number of blood units and total volume of fluid infused during the first 24 h after trauma, the Abbreviated Injury Severity (AIS) scores for head, chest, spine, abdomen and extremities as a function of the Tile and the Young–Burgess classifications. **Results:** There was no significant relationship between occurrence of death and fracture pattern but a significant relationship between fracture pattern and need for blood units/total fluid volume for Tile ( $p < .001/p < .001$ ) and Young–Burgess ( $p < .001/p < .001$ ). In both classifications, open book fractures were associated with more fluid requirement and more severe injuries of the abdomen, spine and extremities ( $p < .05$ ). When divided into the larger subgroups “partially stable” and “unstable”, unstable fractures were associated with a higher mortality rate in the Young–Burgess system ( $p = .036$ ). In both classifications, patients with unstable fractures required significantly more blood transfusions ( $p < .001$ ) and total fluid infusion ( $p < .001$ ) and higher AIS scores.

**Conclusions:** In this first direct comparison of both classifications, we found no clinical relevant differences with regard to their predictive value on mortality, transfusion/infusion requirement and concomitant injuries.

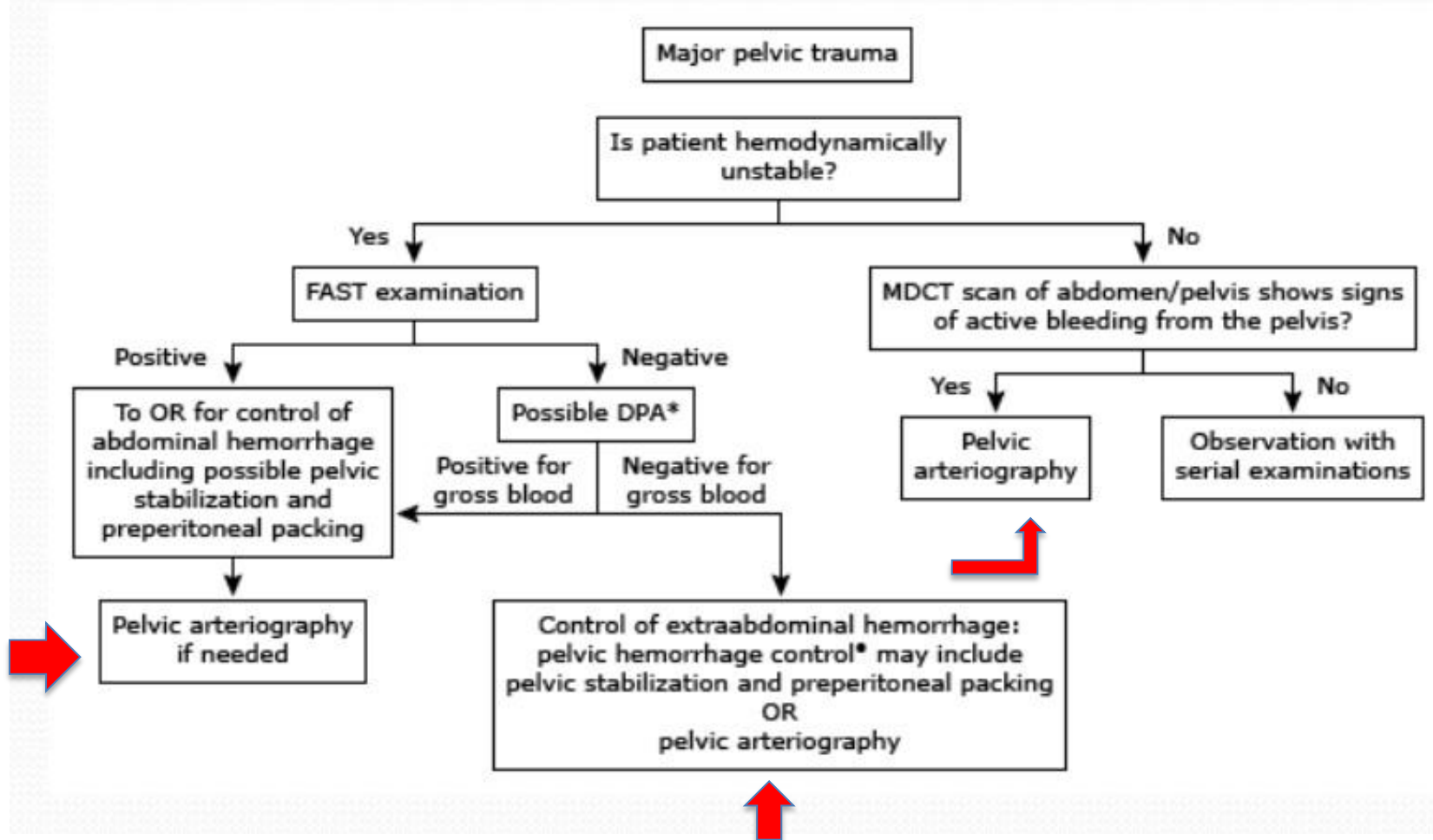
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## Young: Morbidity & Mortality

Fracture Type	Severe Bleeding	Bladder Rupture	Urethral Injury	Urethral Injury
LC - I	0.5%	4%	2%	2%
LC - II	36%	7%	0%	0%
LC - III	60%	20%	20%	20%
APC - I	1%	8%	12%	12%
APC - II	28%	11%	23%	23%
APC - III	53%	14%	36%	36%
VS	75%	15%	25%	25%
CM	58%	16%	21%	21%



# Pelvik Travmada Algoritma



# Algoritma

## Haemodynamically UNSTABLE PELVIC TRAUMA ALGORITHM

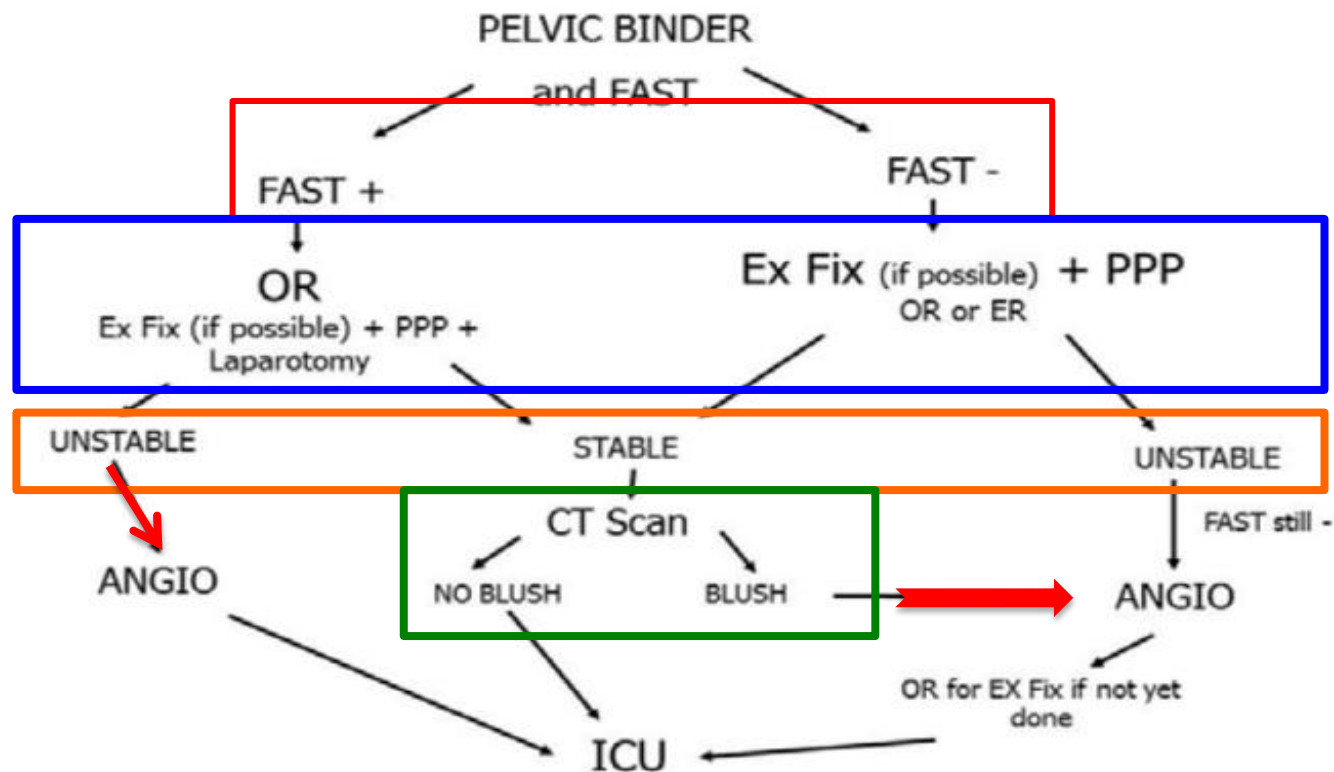


Figure.1 Treatment algorithm

### Legend

FAST: focused assessment sonography for trauma

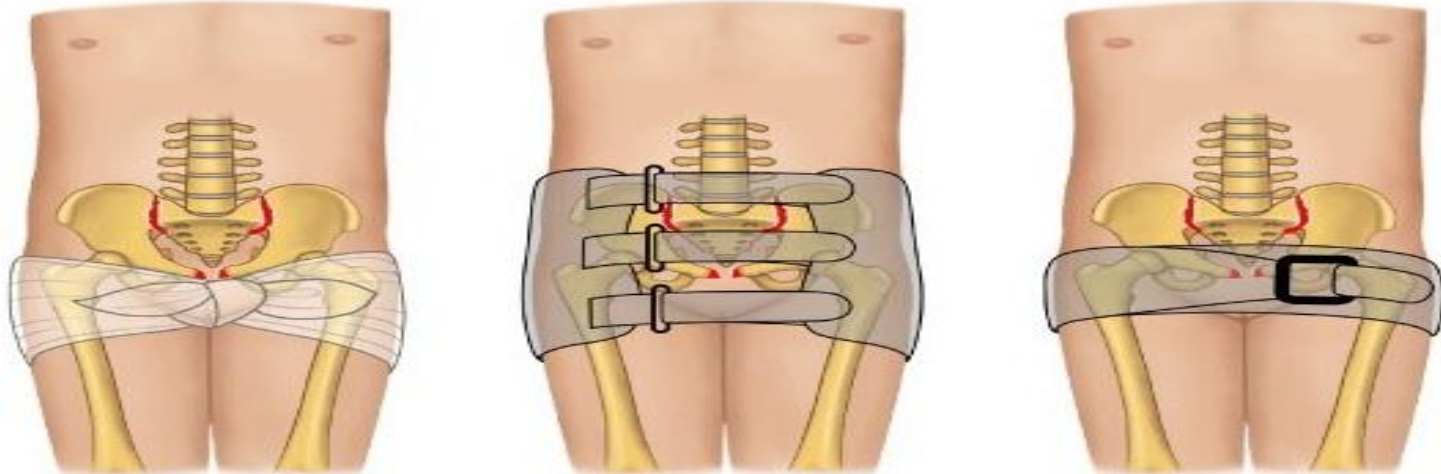
PPP: preperitoneal pelvic packing

OR: operating room

Ex Fix: external fixation

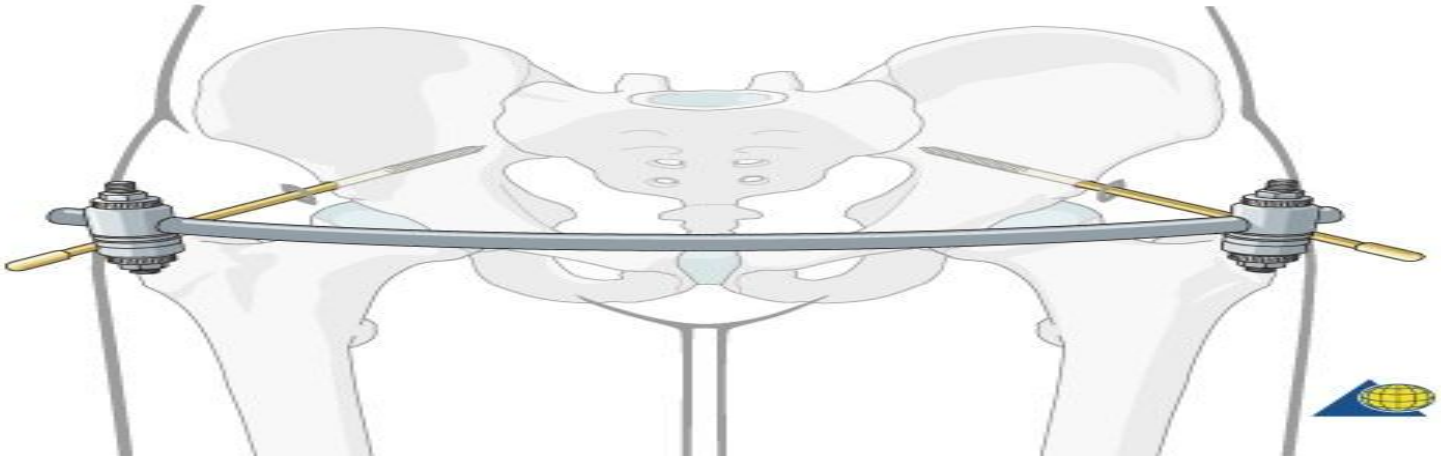
# Pelvik bandaj

- Carşaf veya pelvik bandaj pelvik volümü daraltıp geçici stabilite sağlayarak kanama kontrol altına alınmasına yardımcı olur
- Basit, kolay, ucuz bir yöntem



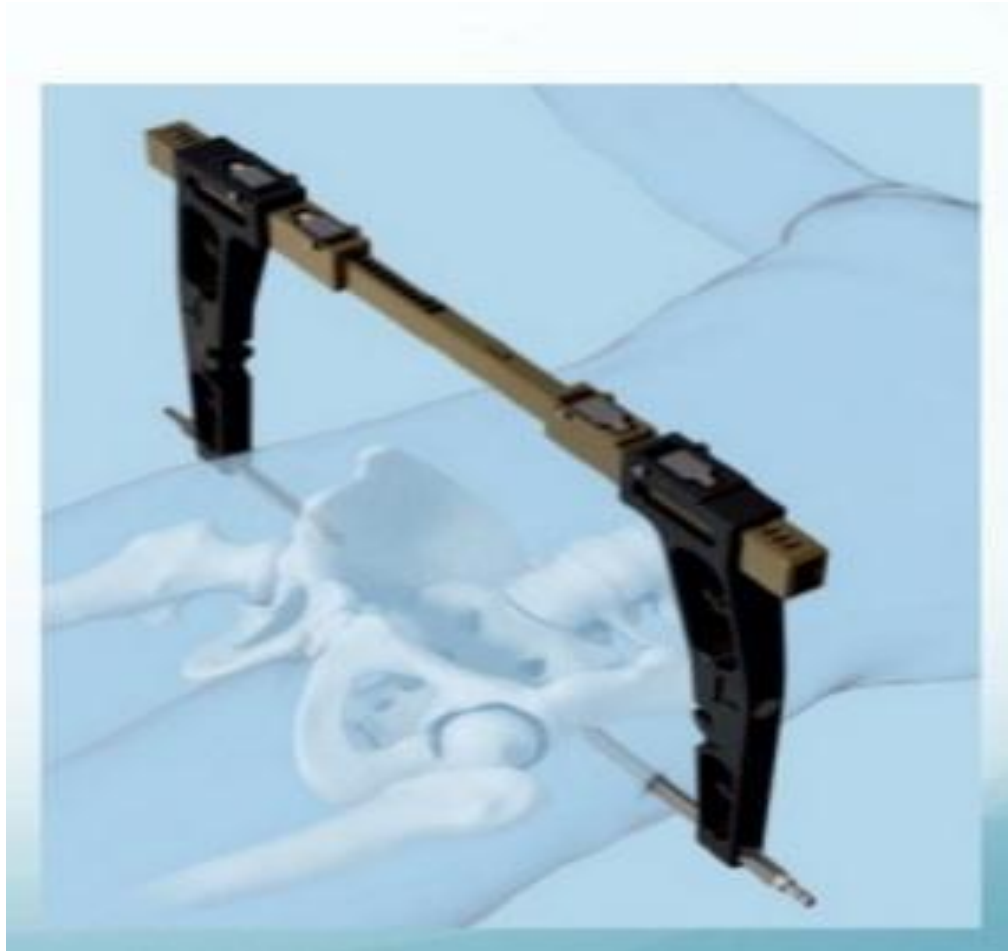
# Eksternal Fiksatorler

- Altın standart olarak kabul ediliyor
- Kırık stabilizasyonu sağlayıp pıhtı oluşumunu kolaylaştırıyor
- Pelvik volümü azaltıp çoğu düşük volümlü kanamayı kontrol edebilir



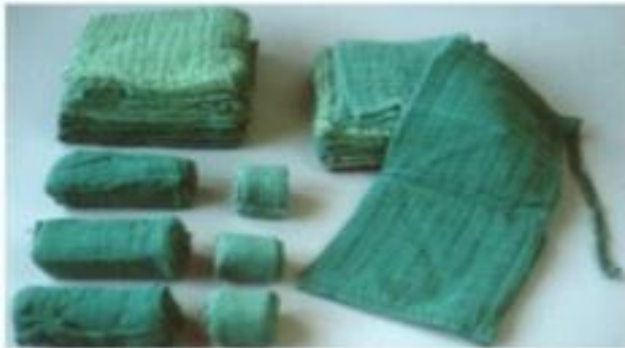


# C Klemp



# Pelvik Tamponlama

## Pelvic Packing



- Ertel, W et al, JOT, 2001
- Pohlemann et al, Giannoudis et al,

# Pelvik Anjiografi

- İlk olarak 1972 yılında literatüre girdi.
- Arteriyel kanamalarda %80-100 arasında başarısı gösterildi.
- Diğer organ yaralanmalarına da müdahale etme imkanı sağlar.
- Pelvik travmaların %90' nında başka organ yaranlaması mevcut
- Bu yaralanmaların %64' ü intraabdominal

# Pelvik Anjiografi

- Pelvik travma yada ona eşlik eden abdominal travmada kanama odağı her zaman açık değil
- Anjiografide hızlı tanı ve tedavi etme şansı



## A B S T R A C T

Retro  
of pel  
56 ha  
Qinghu  
Yohan

<sup>a</sup>Departmen  
<sup>b</sup>Departmen  
<sup>c</sup>Departmen

**Aims:** Both retroperitoneal pelvic packing and primary angioembolization are widely used to control haemorrhage related to pelvic fractures. It is still unknown which protocol is the safest. The primary aim of this study is to compare survival and complications of pelvic packing and angioembolization in massive haemorrhage related to pelvic fractures.

**Methods:** Patients with haemodynamically unstable pelvic fractures were quasi-randomized to either pelvic packing (PACK) or angiography (ANGIO) using the time of admission as separator. Physiological markers of haemorrhage, time to intervention, procedure/surgical time, transfusion requirements, complications and early mortality were recorded and analyzed.

**Results:** 29 patients were randomized to PACK and 27 patients to ANGIO. The Injury Severity Score (ISS) in the ANGIO group was lower than in the PACK group ( $43 \pm 7$  vs  $48 \pm 6$ ) ( $p < 0.01$ ). The median time from admission to angiography for the ANGIO group was 102 min (range 76–214), and longer than 77 min (range 43–125) from admission to surgery for the PACK group ( $p < 0.01$ ). The procedure time for the ANGIO group was 84 min (range 62–105); while the surgical time was 60 min (range 41–92) for the PACK group ( $p < 0.001$ ). The ANGIO group received 6.4 units packed red blood cells (range 4–10) in the first 24 h after angiography. The PACK group required 5.2 units (range 3–10) in the first 24 h after leaving the operating theatre ( $p = 0.124$ ). 9 patients in the ANGIO group underwent pelvic packing for persistent bleeding. 6 patients in the PACK group required pelvic angiography after pelvic packing for ongoing hypotension following packing ( $p = 0.353$ ). 5 patients in the ANGIO group died (2 from exsanguination), while 4 in the PACK group died (none from exsanguination) ( $p = 0.449$ ). Complications occurred without differences in both groups.

**Conclusions**

Compared with angioembolization, pelvic packing had shorter time to intervention, and less surgical time. Pelvic packing is therefore an effective procedure for patients that do not tolerate delay. It is suitable for patients with pelvic fracture-related haemodynamic instability in hospitals where interventional radiology staff is not in-house at all time. Angioembolization remains an excellent method for selected haemodynamically unstable patients with pelvic fractures, but requires advanced technical equipment and staffing.

**Conflicts of Interest**

ORIGINAL RESEARCH

Open Access

# Comparison between laparotomy first versus angiographic embolization first in patients with pelvic fracture and hemoperitoneum: a nationwide observational study from the Japan Trauma Data Bank

Morihiro Katsura<sup>1,2</sup>, Shin Yamazaki<sup>2</sup>, Shingo Fukuma<sup>2</sup>, Kazuhide Matsushima<sup>3</sup>, Toshimitsu Yamashiro<sup>1</sup>

**Table 2 Unadjusted comparison of mortality in laparotomy first versus TAE first cases**

Outcome		All patients N = 317	Laparotomy first N = 123	TAE first N = 194	RR	95% CI
Death within 24 hr	(number (%))	77 (24%)	40 (33%)	37 (19%)	1.71	1.16-2.51*
Death in hospital	(number (%))	102 (32%)	50 (41%)	52 (27%)	1.52	1.11-2.08*

CI, confidence intervals; RR, risk ratio; TAE, transcatheter arterial embolization.

\*p values significant at ( $p < 0.05$ ).



**Review Article**

# **Effect of angioembolisation versus surgical packing on mortality in traumatic pelvic haemorrhage: A systematic review and meta-analysis**

**Ahmed El Muntasar<sup>1</sup>, Ethan Toner<sup>1</sup>, Oddai A. Alkhazaaleh<sup>1</sup>, Danaradja Arumugam<sup>1</sup>, Nikhil Shah<sup>2</sup>, Shahab Hajibandeh<sup>3</sup>, Shahin Hajibandeh<sup>4</sup>**

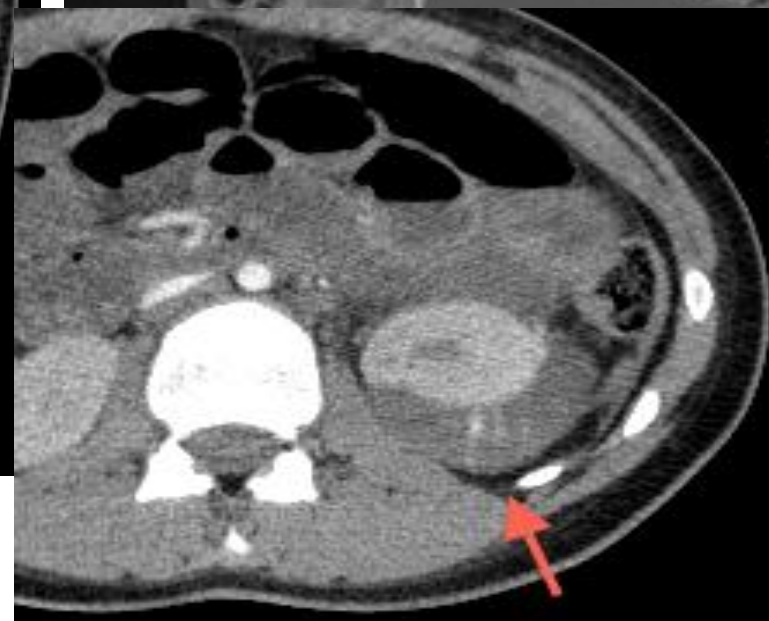
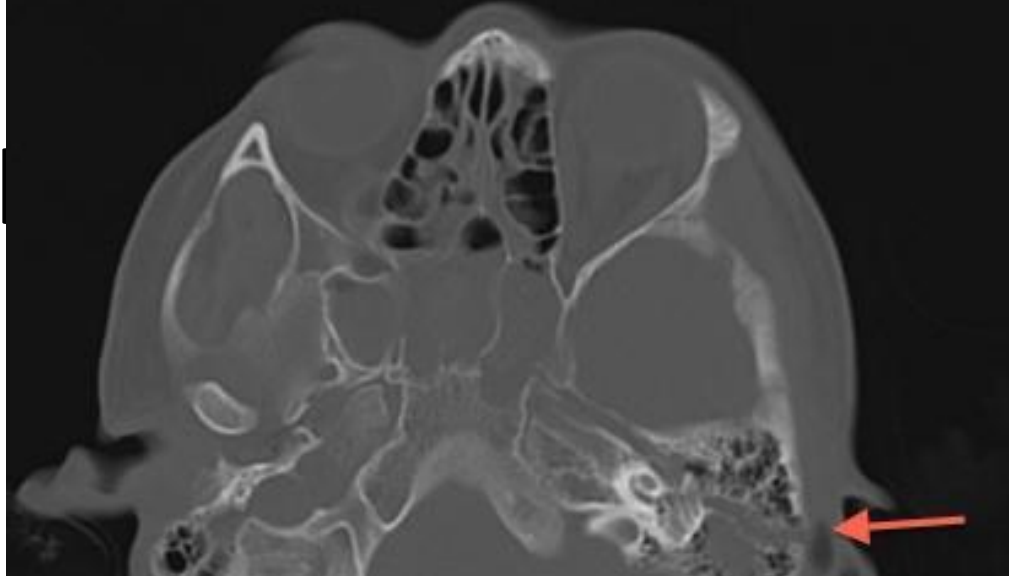
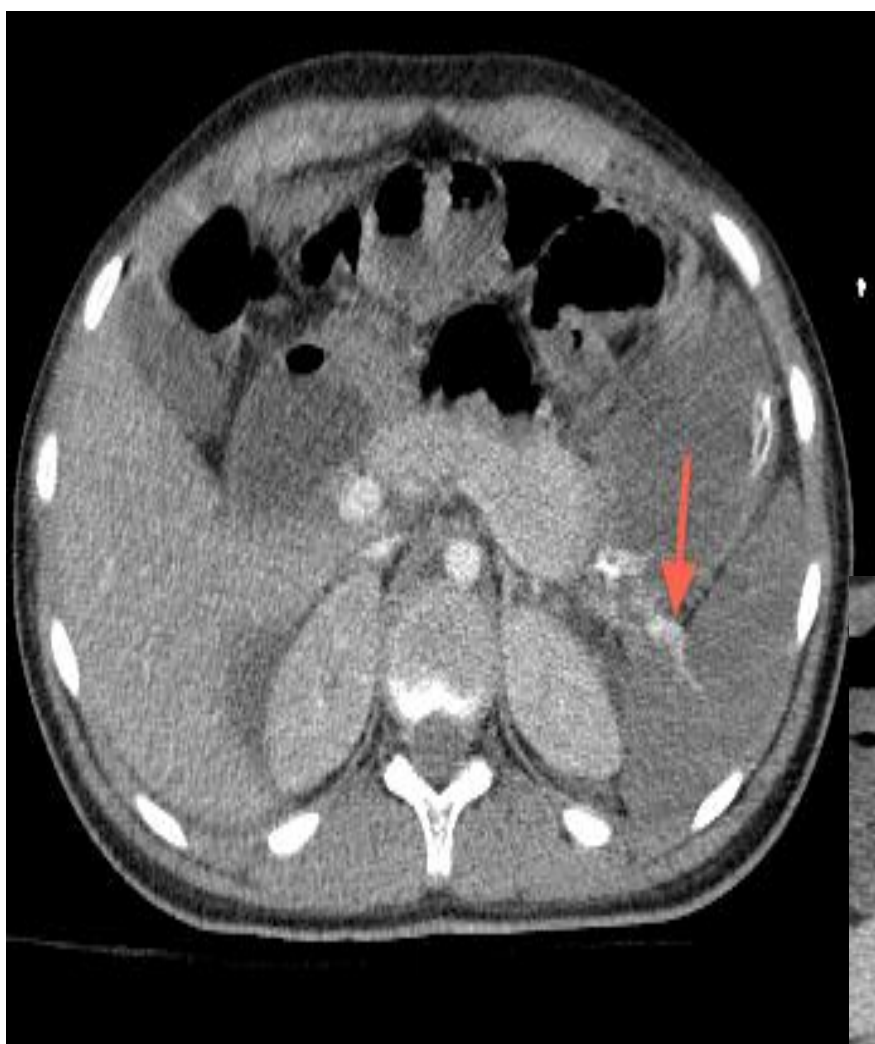
<sup>1</sup>*Department of General Surgery, Royal Blackburn Hospital, Blackburn, UK*

<sup>2</sup>*Department of Trauma and Orthopaedics, Wrightington, Wigan and Leigh NHS Foundation Trust, UK*

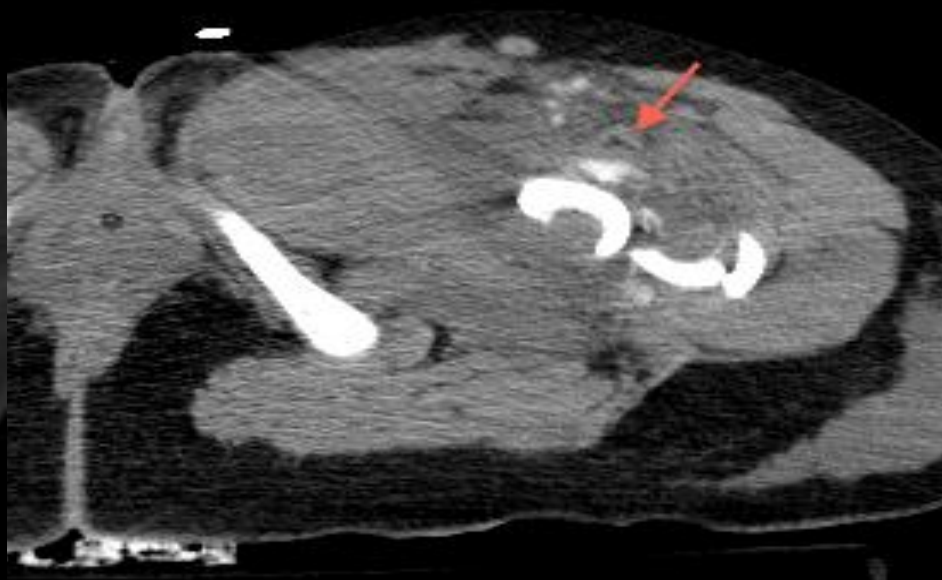
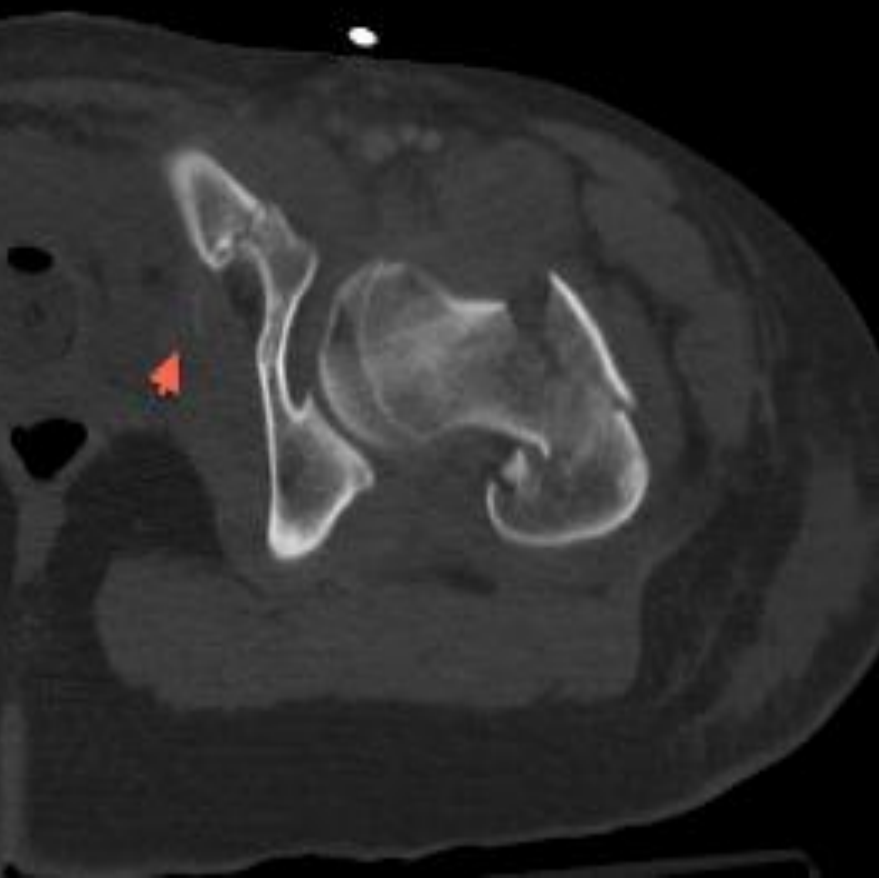
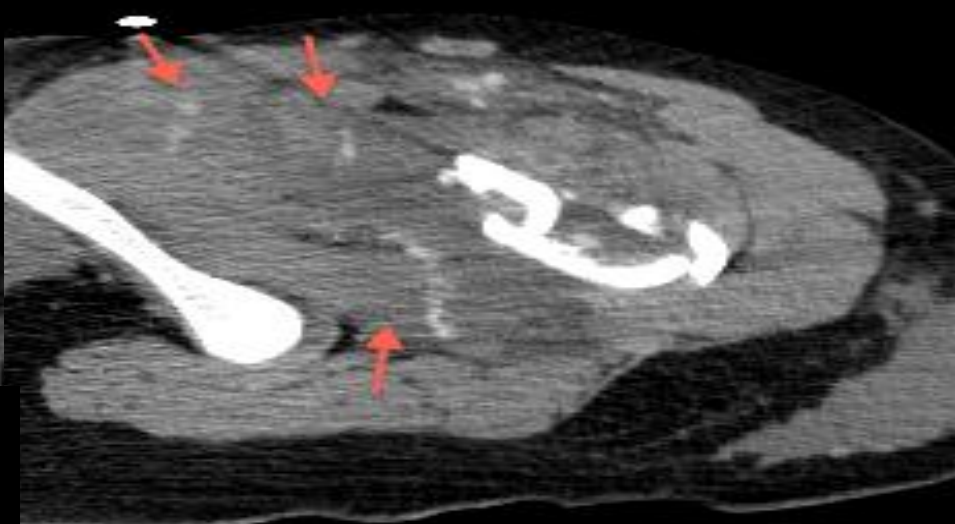
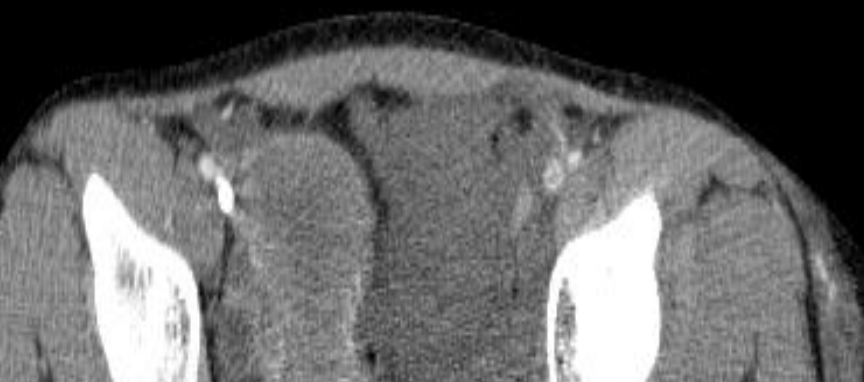
<sup>3</sup>*Department of General Surgery, Salford Royal Hospital, Salford, UK*

<sup>4</sup>*Department of General Surgery, North Manchester General Hospital, Manchester, UK*

**CONCLUSION:** Our analysis found no significant difference in mortality between angioembolisation and pelvic packing in patients with traumatic pelvic haemorrhage. The current level of evidence in this context is very limited and insufficient to support the superiority of a treatment modality. Future research is required.









- Teşekkür Ederim...