

The Role of Endovascular Stenting in Extremity Trauma



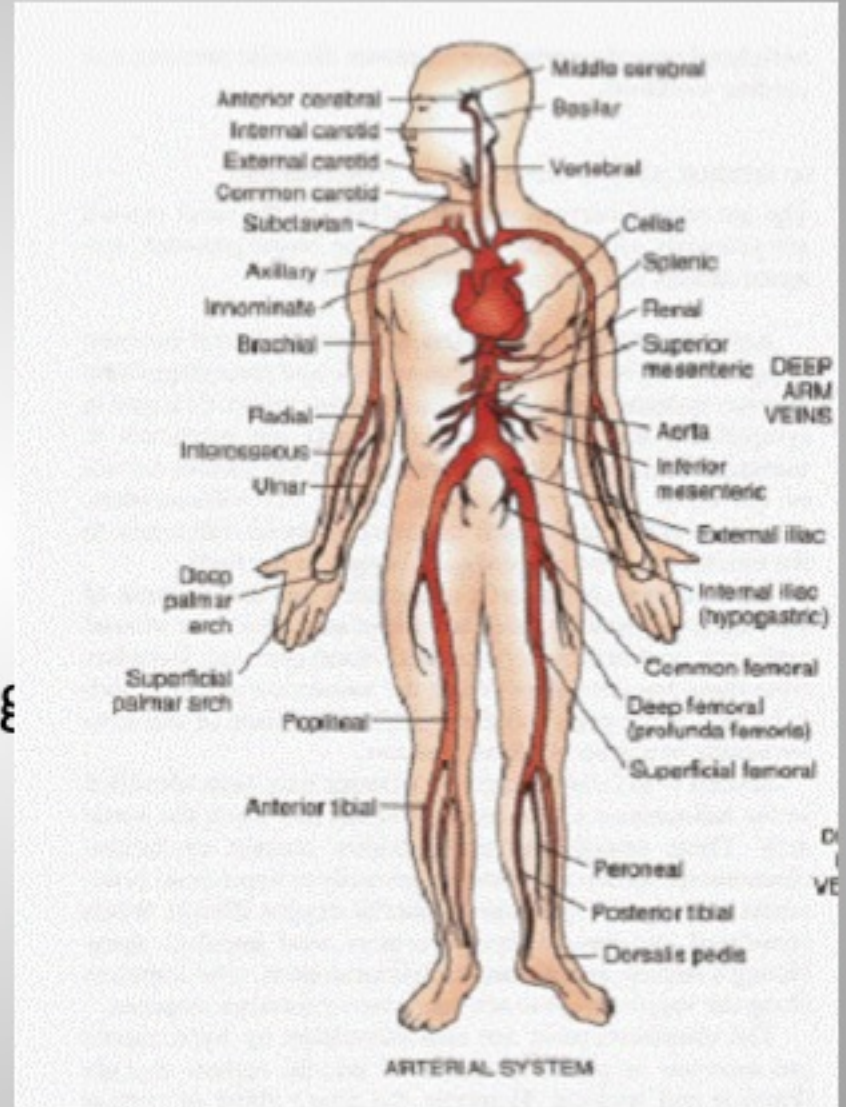
Carl Muthu

Vascular and Transplant Surgeon

Auckland City Hospital

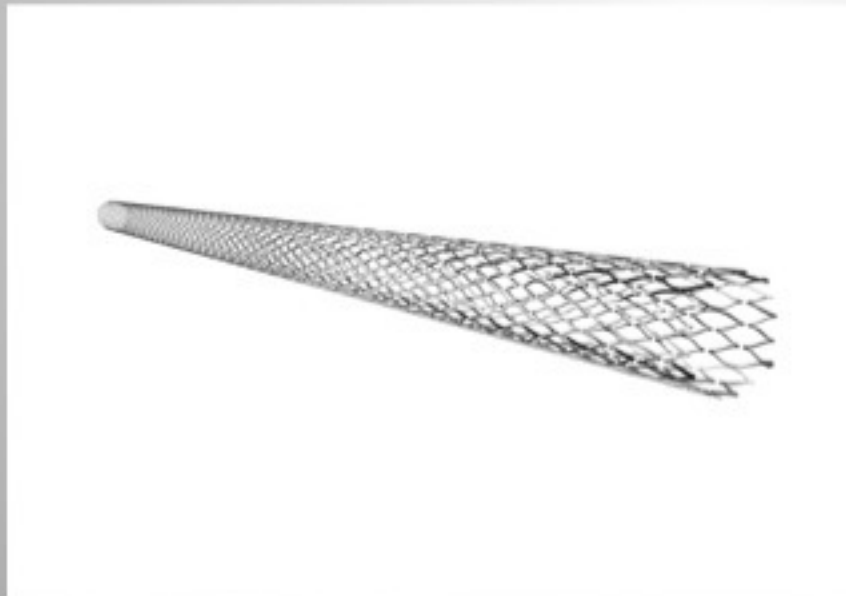
Extremity Arteries

- Not central vessels (e.g. aorta, iliacs) or head and neck vessels (carotids, vertebrals)
- Not non-essential vessels e.g. deep femoral, radial, ulnar, or tibial arteries

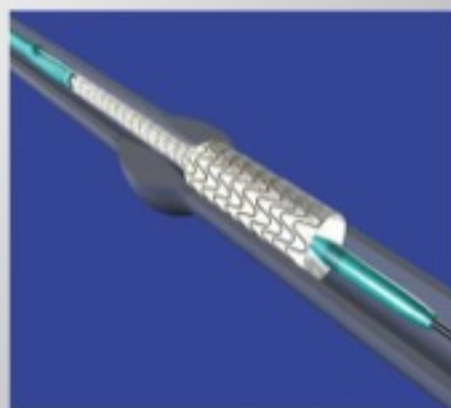
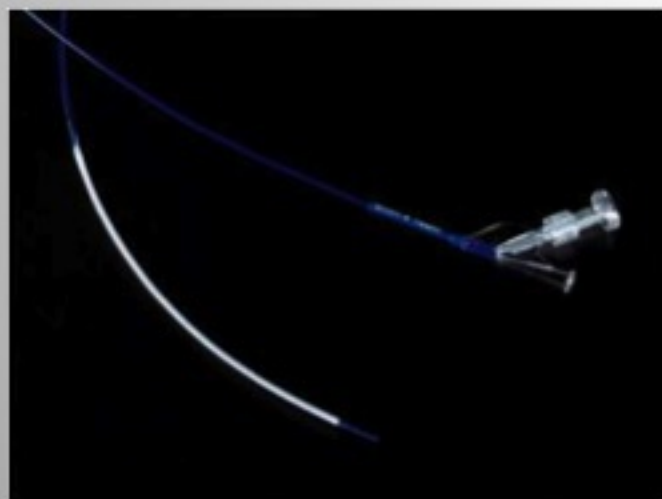
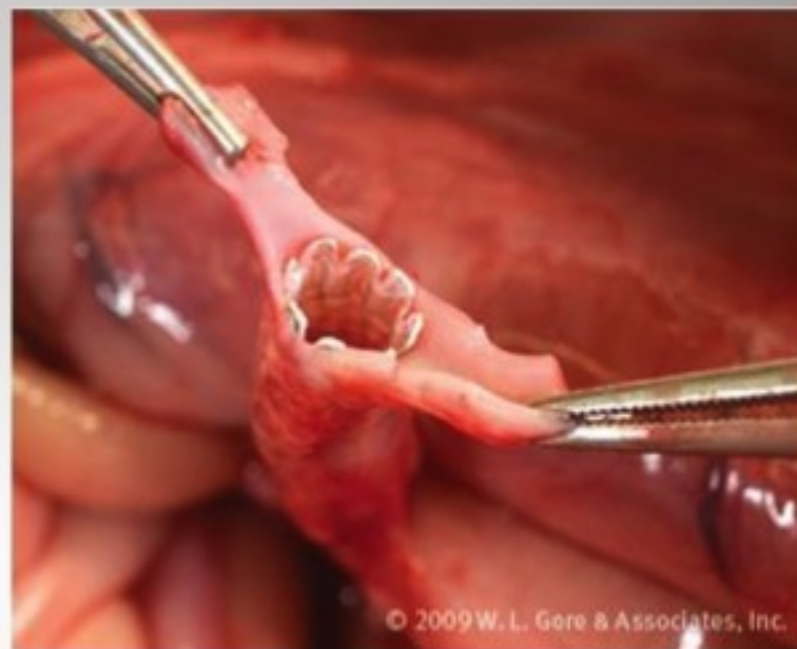
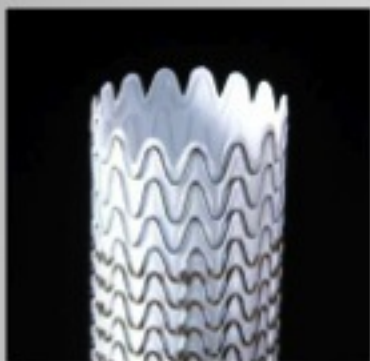


Stents

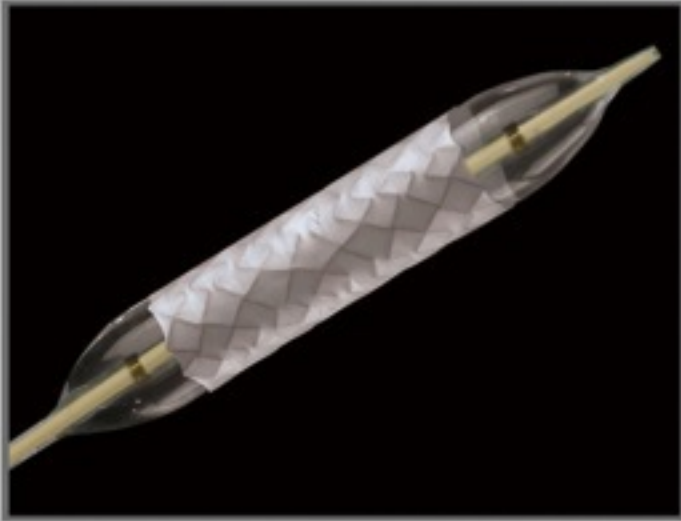
- Not plastic tubes
- Not “chicken wire” meshes
- Covered stents or stent grafts



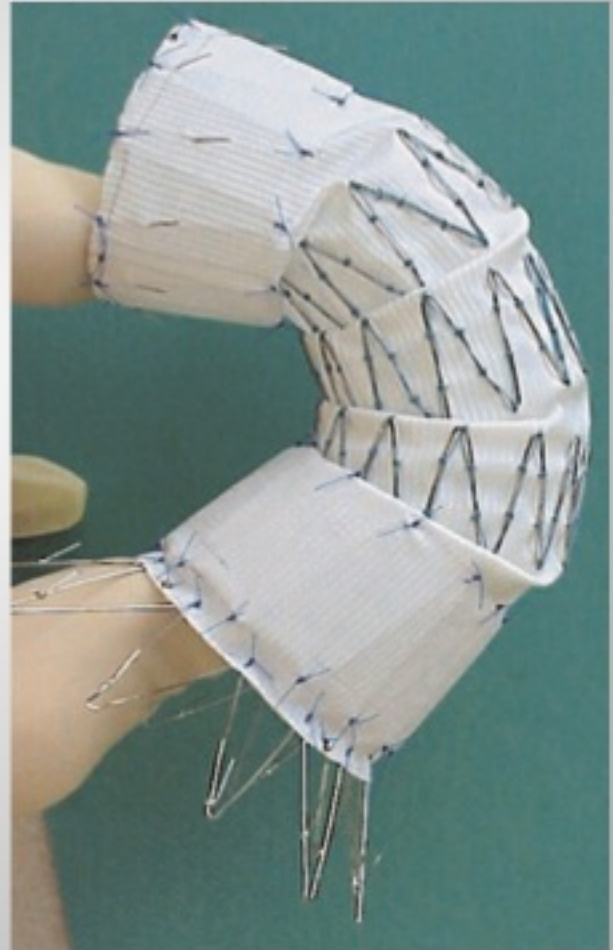
“Viabahn”



“Atrium”

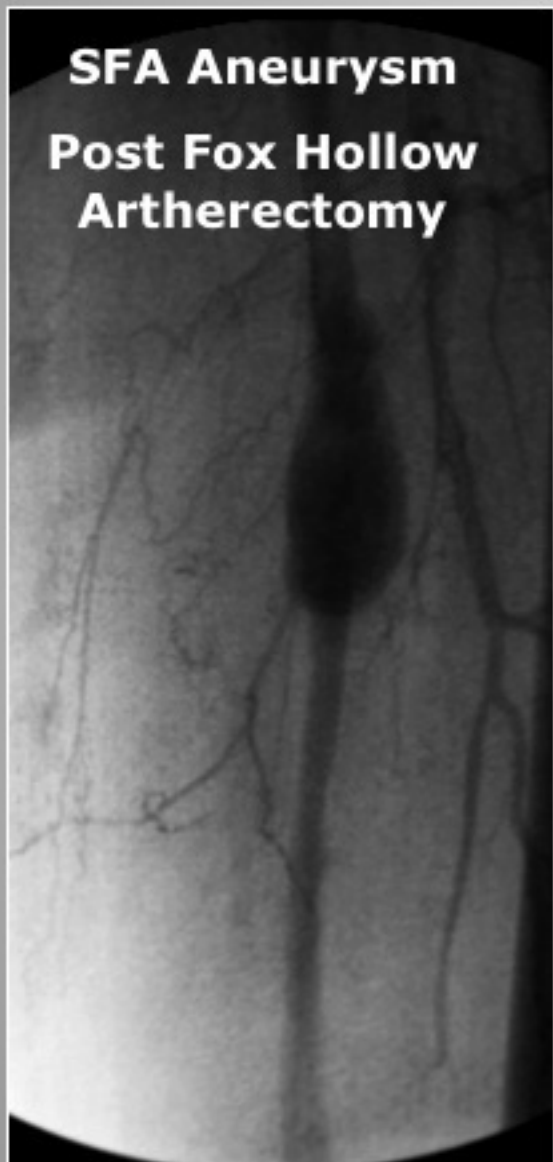


Stent Grafts

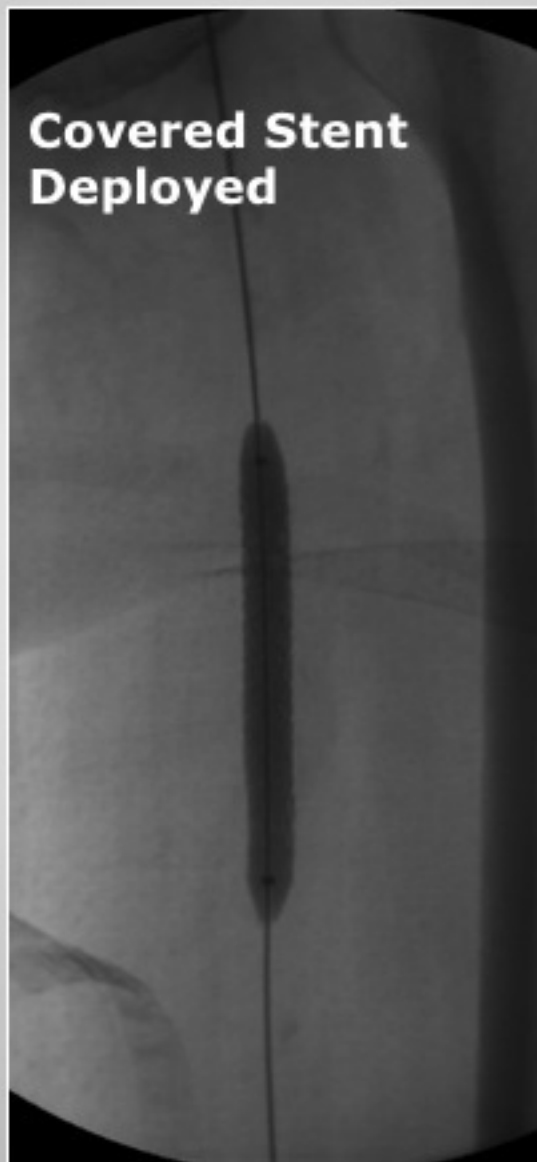


Trauma - Iatrogenic

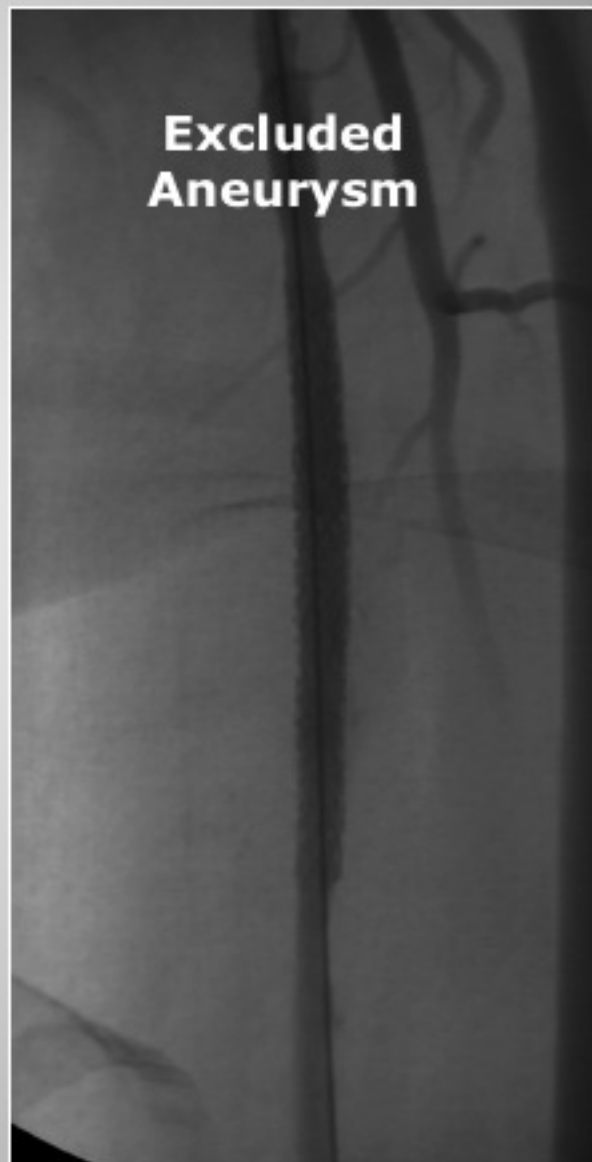
SFA Aneurysm
Post Fox Hollow
Artherectomy



Covered Stent
Deployed



Excluded
Aneurysm



Potential Advantages of Stenting

- Low morbidity
- Rapid????
- Less risk of collateral damage
e.g. neurovascular injury, lymphatic complications, wound problems
- Less blood loss
- Easier??!!!

Limitations of Stenting

- Facilities and Skills (e.g. “Hybrid” theatre)
- Haemodynamic instability
- Pattern of vessel injury –
best for false aneurysms, AV fistulas, not disruptions or occlusions
- Branch vessel coverage
- Flexibility
- Need for concomitant open surgery
e.g. fasciotomy, debridement, embolectomy
- Long term patency rates

Use of Stents in Trauma

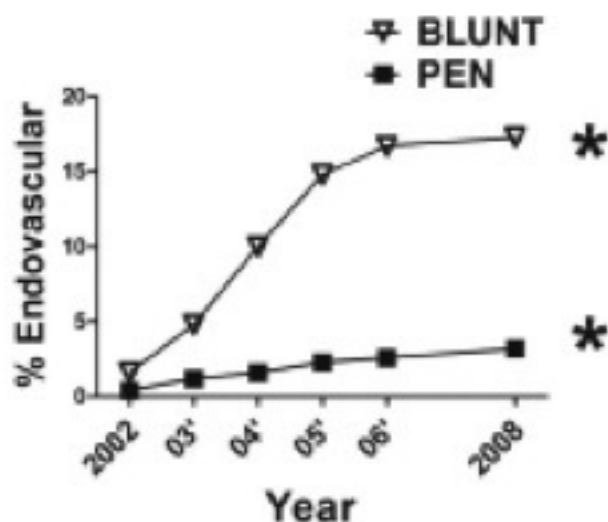


Figure 1. Percentage of ENDO repair procedures overtime for arterial injury when stratified by mechanism of injury.

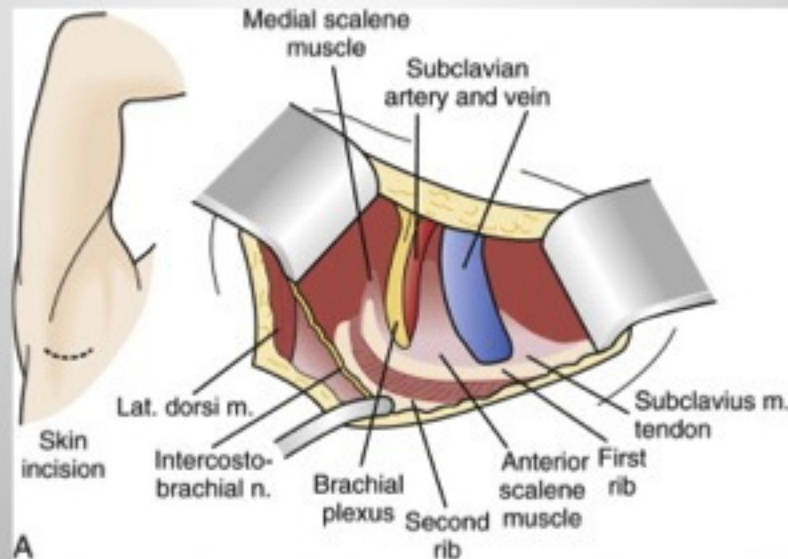
- National Trauma Bank Review (US)
- 2.5 million patients of whom 45,000 underwent arterial repair
- Includes aortic and carotid injuries

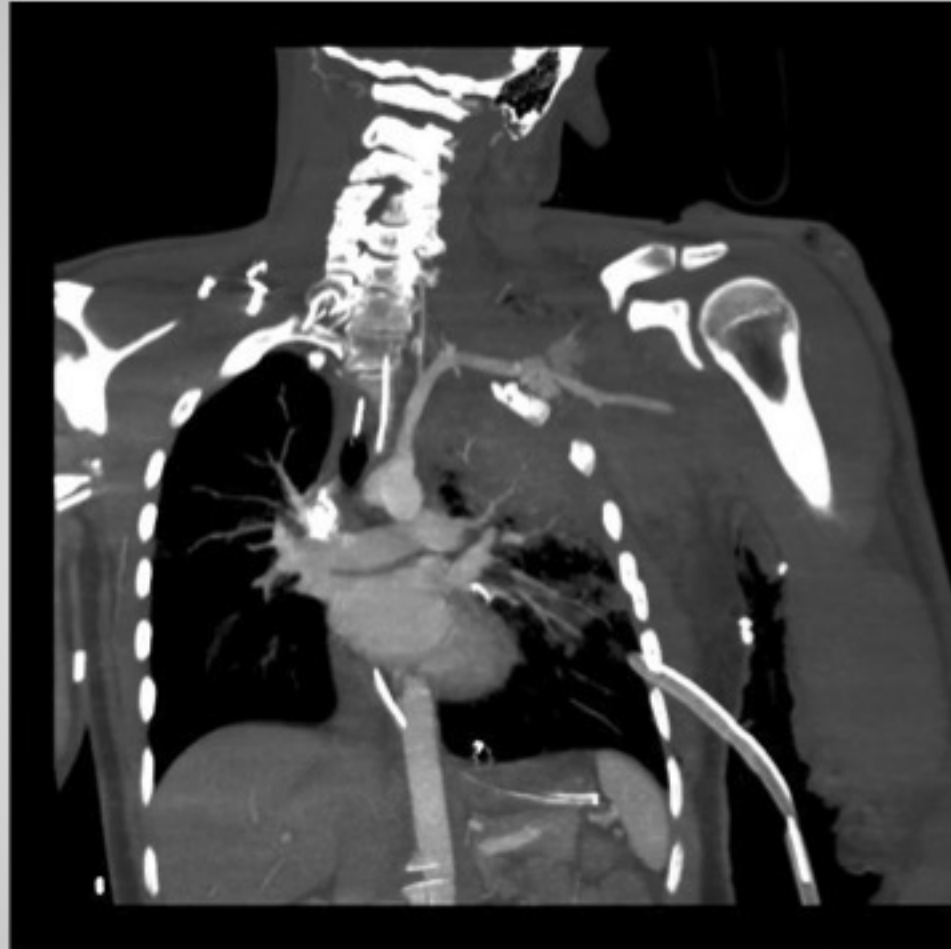
Recent Case Series

- 16 cases of stent grafts for trauma (Sao Paulo, Brazil)
- From 312 arterial traumas (between 2006- 20011)
- Only 6 “true traumas” – rest iatrogenic
- All patients haemodynamically stable – Artery Involved :
Subclavian- axillary in 5, femoro-popliteal artery in 5, carotid artery in 3, iliac in 3
- No deaths or amputations
- 4 patients 9 (25%) occluded stent grafts during follow up (mean time 17.3 months)
but only 1 needed further revascularization surgery

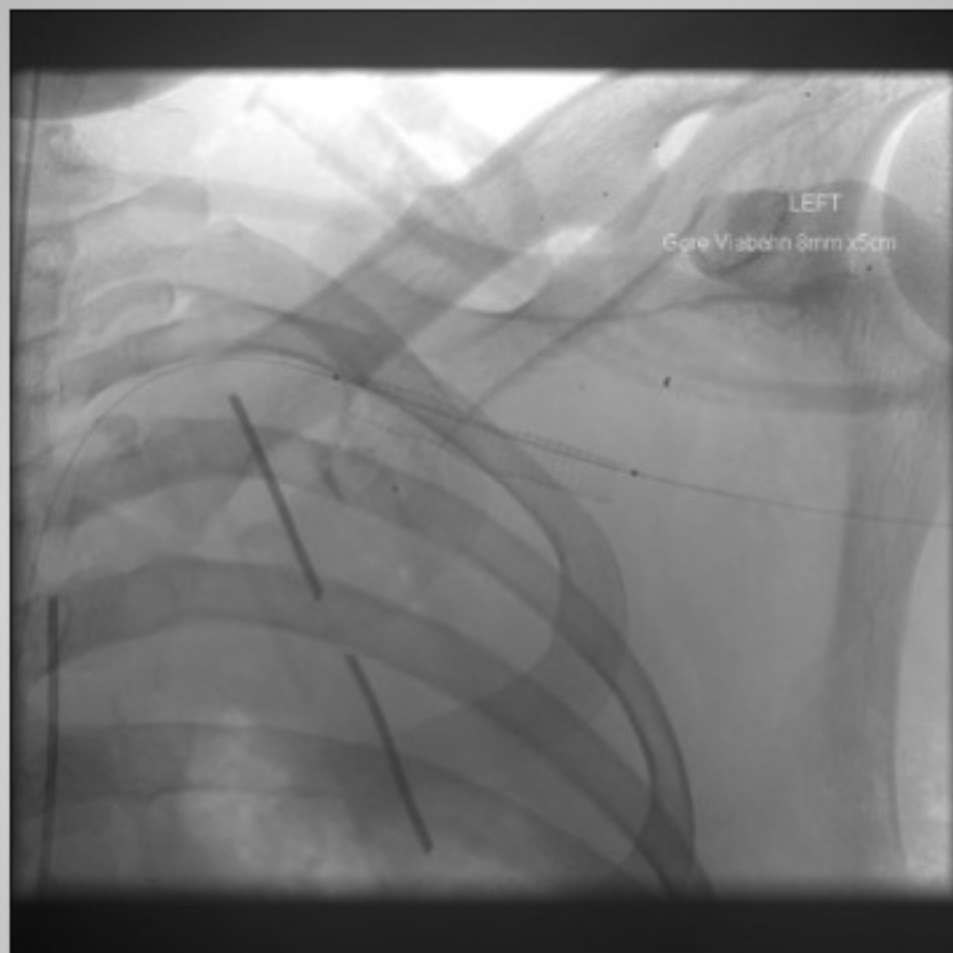
Subclavian Axillary Injury

- Has become the classic site to use endovascular stenting for arterial trauma
- Extremely difficult to expose surgically with high chance of iatrogenic neurovascular injury during emergency surgical exposure















Review of Literature

- “Endovascular management of axillo-subclavian arterial injury: a review of published experience” Rasmussen et al Injury November 2012, 43:11; 1785-1792
- Reviewed all literature from 1990-2012
- 150 subclavian and 10 axillary artery injuries adequately described for 160 patients from 1996 to present

Subclavian-Axillary Artery Injury

- Injury Mechanism:

Penetrating trauma 56%

Blunt trauma 21%

Iatrogenic trauma 23%

- Injury Pattern:

Pseudoaneurysm 48%

AV fistula 17%,

Occlusion 10%,

Transection 5%,

Perforation 14%

Dissection 4%

- Age range: 10-93 years

Subclavian-Axillary Artery Injury

- GA only used in 16% of cases
- Femoral access only 67%, Brachial access only 19%, 8 % combine access
- 155 patients stents successfully deployed – 4 needed conversion to open, 1 balloon control
- 5 patients has access site related complications (all brachial)

Subclavian Axillary Artery Injury

- One mortality (not related to endovascular intervention)
- One neurological deficit
- 85% patency (variable follow up – discharge to 70 months)
- Variable anticoagulation regimens
- 12 pts -> repeat endovascular intervention
- 1 pt -> delayed surgical bypass for stent occlusion
- Conclusion: Early results promising ...more study..

Conclusions

- There is an increasing role for stenting in extremity trauma
- **Factors to consider**: local facilities and expertise, haemodynamic stability, need for concomitant surgery, risk of collateral damage with surgical exposure, and the anatomic nature of the arterial injury
- Subclavian-axillary artery injuries are the best indication for stenting in extremity trauma