Treatment of aneurysmal angioaccess: What is better to keep a functioning haemodialysis access?

M A Morsy; MBBCh, MSc, MD, MRCS, PhD, FEBS

Renal Transplant Unit, St. George's Hospital

CACVS, Paris
23 January 2015

St George's Healthcare NHS
NHS Trust

- I have no conflict of interest to report

Angioaccess complications

- Primary Failure and Non-maturation
- Stenosis
- Thrombosis
- Steal
- Aneurysms
- Infection
- High output heart failure

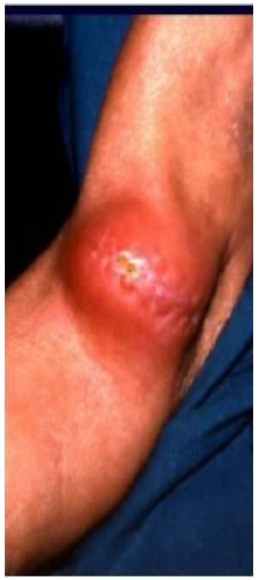
- CV Obstruction
- Bleeding
- Fluid collection:
  - Seroma
  - Haematoma
  - Lymphocele
- Neuropathy

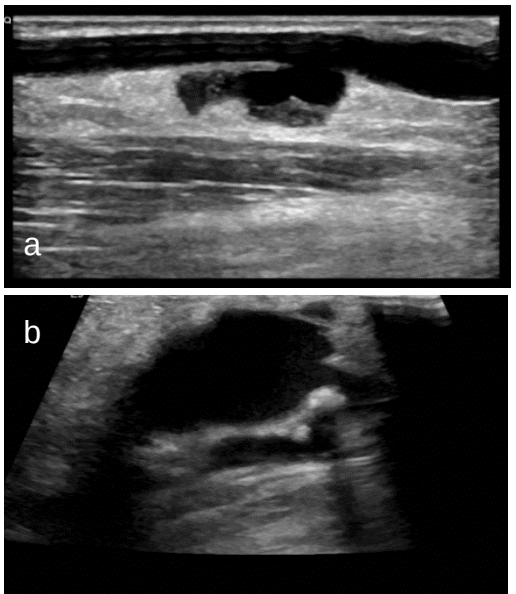
Aneurysms

- **False aneurysms: (more common with prosthetic access)- 2-10% (access life), 0.05-0.1/patient-year?***

  Anastomotic (infection?)

  Needling site





**Euter XH, J Vas Surg 2008*
**Rooijens P, J Vas Surg 2008*

Aneurysms

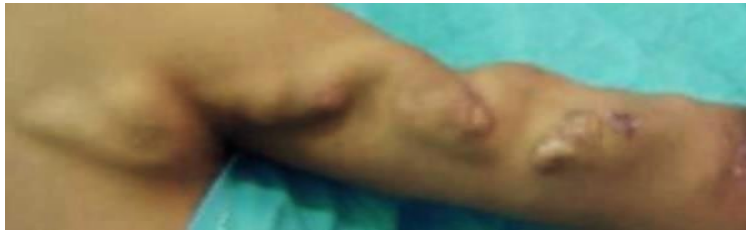
- **Aneurysmal expansion/dilatation/elongation**

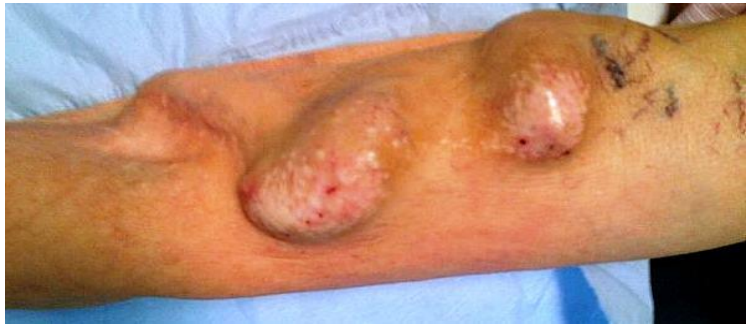
  - Autogenous, biological

  - 0%- 6%(median 4%)**

  - As high as 43% ***

- Effort to classify angioaccess aneurysms (King's **)**





Huber T, J Vasc Surg, 2003
****Woo K, J Vasc Surg, 2010***
***** Valenti D, Endovas Surg 20014***

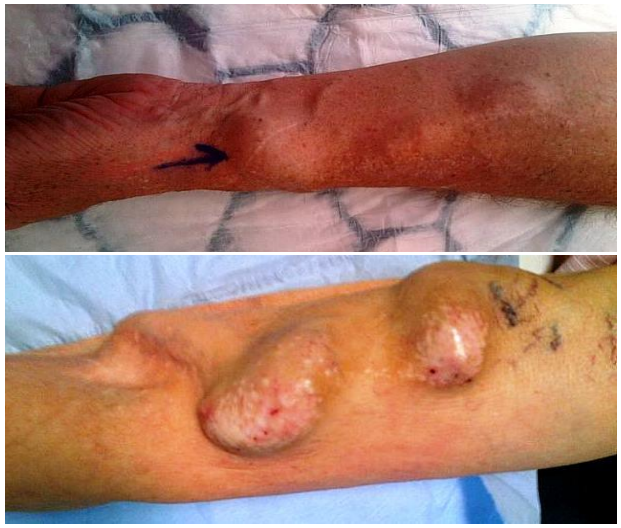
Pathophysiology/Risk factors

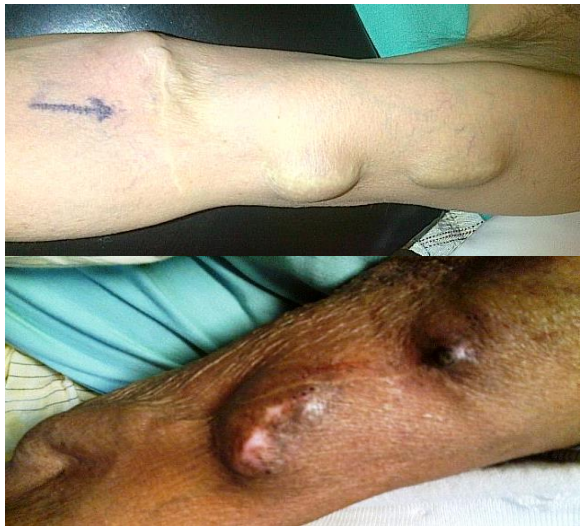
All angioaccess veins are aneurysmal. (>x2 original diameter). (aneurysmal expansion)

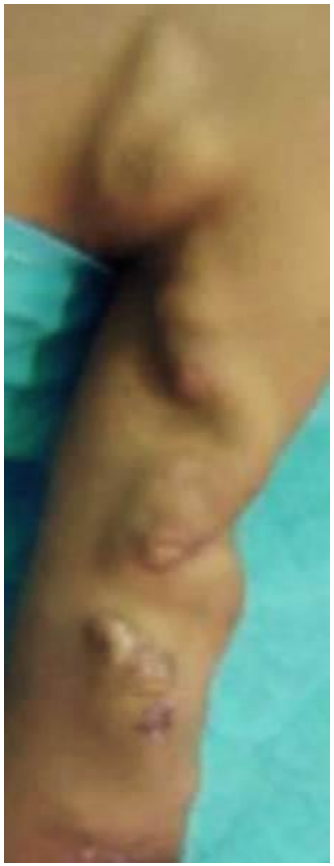
- **post needling (walling)**
- **Frequent needling**
  - **- Degenerative changes in autogenous**
  - **- Wall integrity loss/ communicating punctures**
- **Peri-anastomotic (bleeding)**
- **Infection**
- **Haemodynamic:**
  - **- Close to the arterial inflow**
  - **- Venous hypertension (outflow obstruction)**
  - **- Post/Pre stenosis**

Presentation

- **Aneurysms expansion (site)**
  - **Juxtaanastomotic/anastomotic**
  - **Mid-access (frequent)**
  - **Localised further upstream (rare)**
  - **Diffuse**







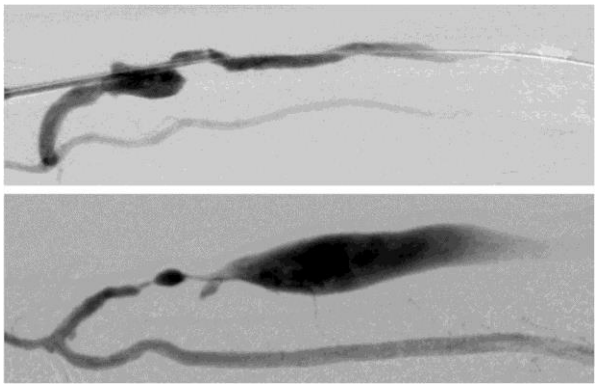
Presentation

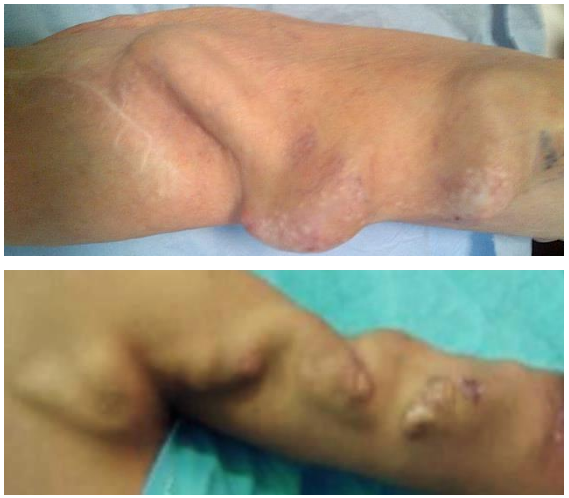
- **Pattern:**

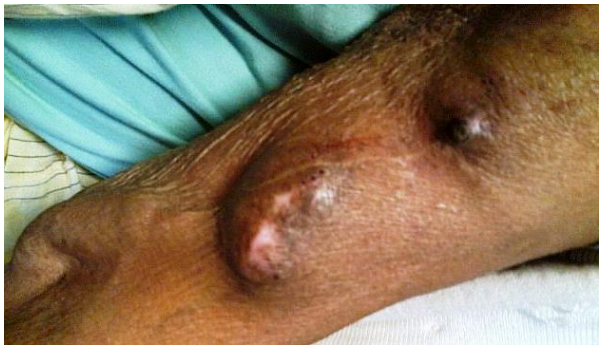
  - localised post-stenotic, pre-stenotic/ frequent needling sites

  - diffuse aneurysmal dilatation affecting the whole vein

  steroids or unused angioaccess or venous outflow obstruction





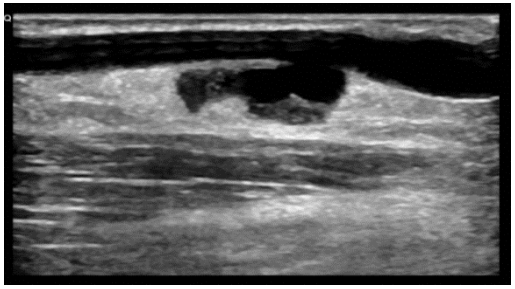


Presentation/clinical

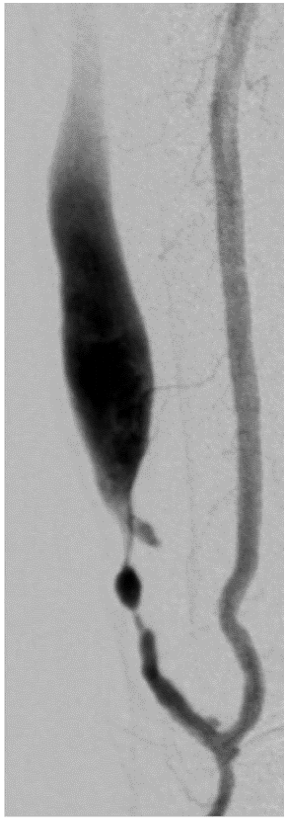
- **Complete/partial thrombosis**
- **Unsuitable for needling: Short needling segment**
- **Unhealthy skin cover**
- **Signs of impending rupture**
  - **Shininess/thinning/redness of skin cover**
- **Infection**
- **rapid expansion**
- **Steal**
- **Pain**

Associated with inefficient dialysis, venous hypertension, prolonged bleeding

Presentation/clinical



- Clinical Examination
- Duplex scan
  - Pre or post aneurysmal stenosis
  - Thrombosis
  - Velocity, flow
  - Central veins
- Fistulogram
  - pre or post aneurysmal stenosis,
  - Thrombosis
  - Central veins.



Surveillance is required in a regular basis if intervention is not indicated.

Treatment

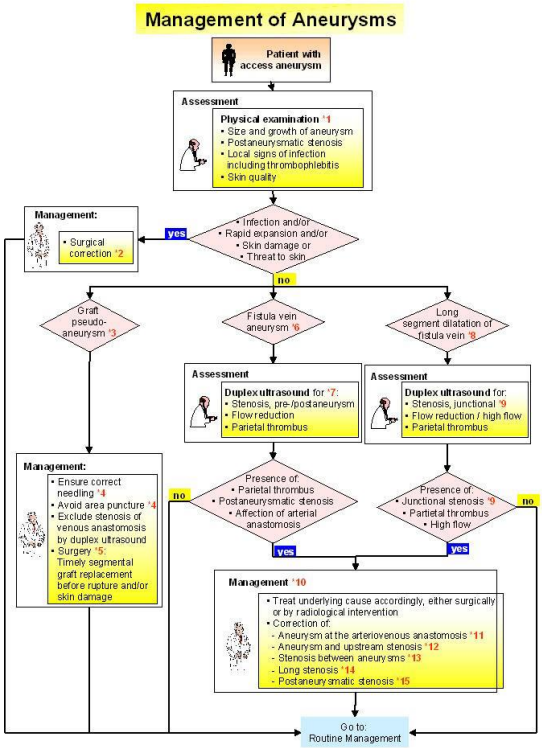
Why to treat aneurysms?

- To prevent complications
- To prolong the life of angioaccess

Treatment Indications (Guidelines are opinion based)

The majority does not need intervention (VAS)

- Thrombosis
- Risk of rupture
- Skin damage [erosion, infection]
- Rapid expansion
- Stenosis
- Shortness of needling area
- Involvement of arteriovenous anastomosis
- Disfigurement (patient choice) - Pain
- All false aneurysms (including small or narrow neck if > one week; twice the size of the access diameter)



Huber T, J Vasc Surg, 2003
Woo K, J Vasc Surg, 2010
KDOQI
Valenti D, Endovas Surg 20014

Rescue

The rescue modality depends: (Urgent, Programmed, staged)

- Expertise

- Feasibility.

- Presentation, location, skin condition, thrombosis or stenosis

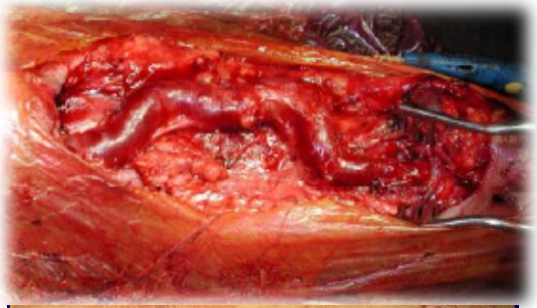
- **The timing of rescue is the most important determinant**
- **Rescue Modalities:**

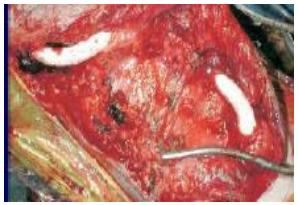
- Surgical rescue

- endovascular rescue (angioplasty/stenting)

- hybrid approaches

Rescue





surgical rescue

- **Autologous:**

  End to end repair (*resection and repair)*

  New anastomosis (*removal re-implantation*)

  Aneurysmorraphy (*partial wall resection-stitch repair*/plication or stapling*) exoprothesis enforcement[$] (Patency rates70-95% patency at one year)**

- **Synthetic graft (interposition graft)[£]**

  - After resection of aneurismal segment or

  - Exclusion and bypass

***Hossny A, J Vas Surg 2014**

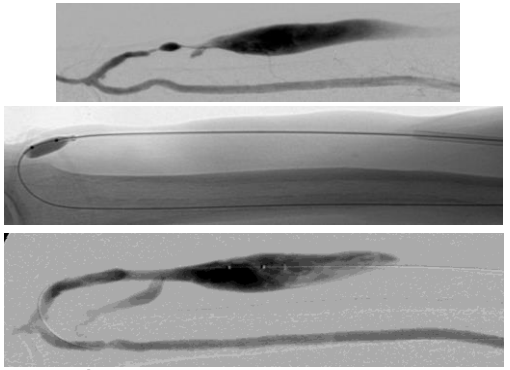
***Woo K, , J Vas Surg 2009**

[£]* Pasklinsky G, J Vas Surg 2011

*****Tozzi M, , J Vas Surg 2014**

$ Berard X J Vas Endovas Surg 2010

Rescue



Endovascular

- **Thrombectomy, Angioplasty/dilatation of stenosis**
- **Thrombin injection in false aneurysm (narrow neck)**
- **Endografts to exclude large Pseudoaneurysm and treat stenotic segments** •Shemesh D J Vasc Surg. 2011; Shah AS, J Vasc Surg. 2012; Georgiadis GS, Int J Artif Organs. 2010; Peden EK. Semin Vasc Surg. 2011; .Zink JN, J Vasc Surg. 2013

  Complications with stents/ Stent grafts

  - Thrombosis (70% patency-3 months, 20%-one year) (Vesley T Sem Vas Surg 2007)

  - erosion; rupture; haemorrhage, migration, - fracture.

- **Hybrid approach:**

  - Endovascular/surgical (surgical repair/PTA/stent graft).

Our Experience

Access	Type		Indications	Intervention	Outcome
	True	False			
Autogenous **BC (*n*=7)** **RC (3)**	**6**	**1**	Thrombosis in 3 Expanding with unhealthy skin in 2 Declining/partial thrombosis in 1 Postenotic aneurysms in 4 False: narrow neck	Resection/end to end 1, Aneurothmoraphy 4, Exclusion bypass graft 2 False: Thrombin injection	**Patent** **Used within 24 hours except 2 after a week**
	3	**0**	Thrombosis in one Declining/partial thrombosis in 2 Postenotic aneurysms in 2 pre-aneurysmal stenosis in one	Resection/end to end 1, Aneurothmoraphy 2,	**Patent** **Used within 24 hours**
AVG (*1*)	**0**	**1**	Wide neck large	Surgical repair	**Used same day, infected and removed after 6 months**

The rate of aneurysmal angioaccess is about 10%. The majority doesn't need Rescue
Only 11 out of 320 (0.34%) angioaccess needed intervention

Final Conclusion

- **Presentation of aneurysmal angioaccess varies.**
- **The majority does not need intervention.**
- **Various rescue procedures can be used individually or in combination including endovascular intervention. However, surgical intervention is the preferred and recommended rescue modality.**
- **Stents or stent grafts is debatable area (type, indication and outcome)**

  - It's important that the implanted stents do not make future surgical procedures difficult.

  - The stents can easily be punctured during haemodialysis sessions.