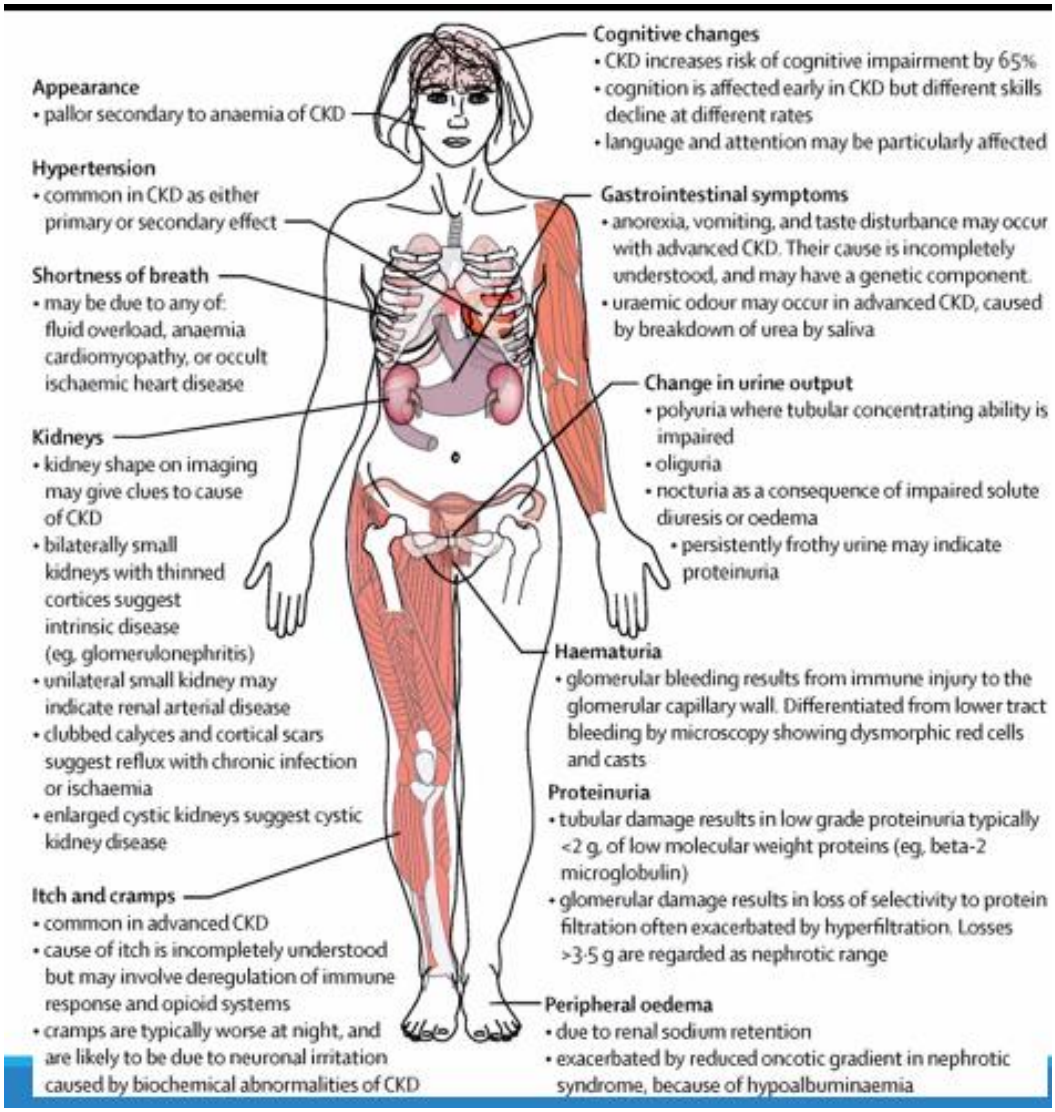
Rouleaux Club : Vascular and Renal – 30 March 2023

Before ESRF

- Management of kidney failure
- 4 Key filtration functions
    - remove toxins
    - balance osmotic pressure
    - balance electrolytes
    - maintain pH (additional – stimulate bone marrow)
- Causes of failure:
    - Prerenal: renal artery stenosis
    - Renal: Glomerular, Tubular, cystic
    - Post renal: Outflow obstruction
- Symptoms of kidney failure:



ESRF symptoms:

- irretractable SOB
- gross electrolyte imbalance and acidosis
- uraemia (confusion, altered mental state)

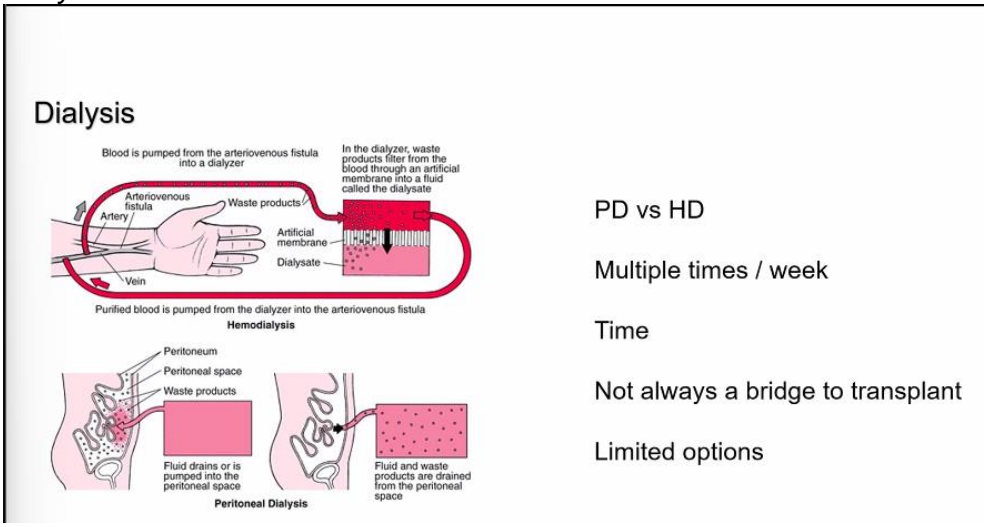
Patient Journey:

- What are your options?
  - Replace system (renal transplant)
  - Jury-rig new system (dialysis)
  - not fix system (palliative care)

Transplantation:

- Major operation, requiring a high level of fitness.
- Limited resource, with a waiting list.
- Lifelong rejection drugs, which may impact immune system.
- Temporary.

Dialysis:



- Impacts a patient's lifestyle

Palliation:

- Comes down to patient choice
    - limited life expectancy
    - poor patient engagement
- usually decided @ low clearance clinics

Role of Vascular Access Nurse – Sue Smith

Vascular Access Clinic

- Patients are referred from the low clearance clinic.
- When possible this should be as soon as possible, to allow time for the patient to understand and accept their plan of care and any complications that may arise with the fistula surgery.
- Patients are assessed for both dialysis modalities ,to save attending the clinic again and also the patient may change their mind
- The patients veins are scanned and a suitable site is identified for the fistula.

Patient Education

- The patient is given an alert wrist band to save the vein, as they have regular blood tests and possible hospital admissions ,and may need a venflon putting in.
- The patient is also given a stress ball to use before and after the fistula surgery to help strengthen the vein, also a stethoscope to listen to the fistula .
- Lastly they are given a patient information leaflet about the fistula surgery,which includes the access nurses telephone number.

Surgical Considerations: Patients have decided on HD

Haemodialysis

High flow of blood (>350ml/min)
Whole blood volume every 15 minutes

Accessible vessel

Acceptable stiffness

Acceptable calibre

- This blood vessel doesn't exist!!!
- Arteries are too deep
- Deep veins are not readily accessible or stiff enough
- Superficial veins don't have enough flow, and aren't stiff enough

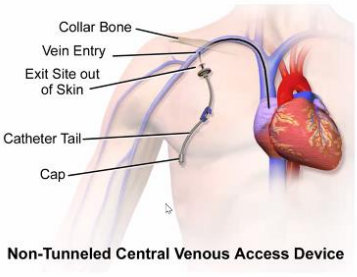
You need to design a high flow rate, superficial channel, adapted from a machine consisting of

- A high flow rate, low pressure, deep circuit
- A high flow rate, high pressure, deep circuit
- A low flow rate, low pressure, superficial circuit

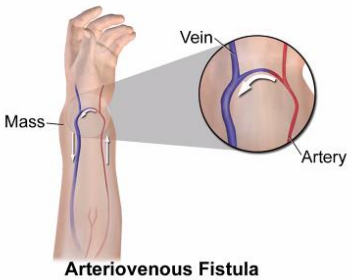
What are your options?

1) Connect a free conduit to a deep circuit
2) Connect the superficial circuit to the high pressure circuit

Vascular access options

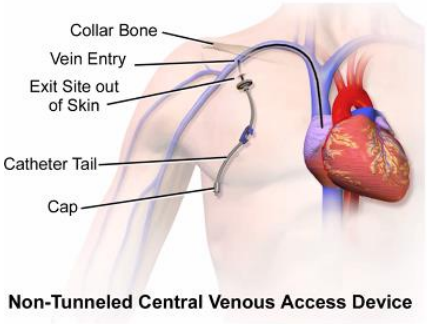


Non-Tunneled Central Venous Access Device



Arteriovenous Fistula

Central lines



Non-Tunneled Central Venous Access Device

Quick

Pain free, once in

Damage to central veins

Infection

Death

- 30% of renal bed days are taken up by patients w/ line infections
- Starting & continuing dialysis w/line have about 7x increased mortality @ 30 days

Fistulas

8-12 weeks to mature

Needling

30% failure rate

Cardiovascular shunting

Anatomy dependent

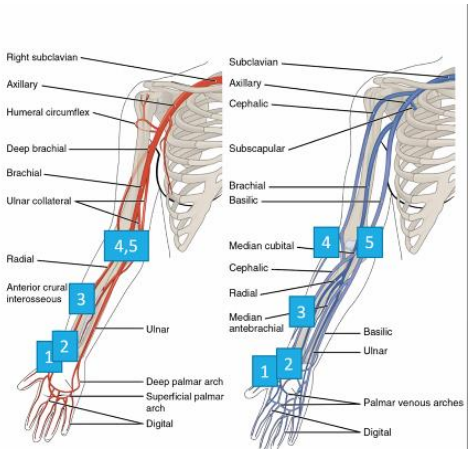
- Need time to mature.
- Needling pain
- High failure rate 1/3 don't mature
- Cardiac shunting gives higher risk of heart failure

The ideal fistula

Pre Op	At maturation check
>2.5mm vein	≥6mm wide
>2mm artery	≤6mm deep
No inflow disease	≥600ml/min
No outflow disease	≥6cm long

Choosing where to make a fistula

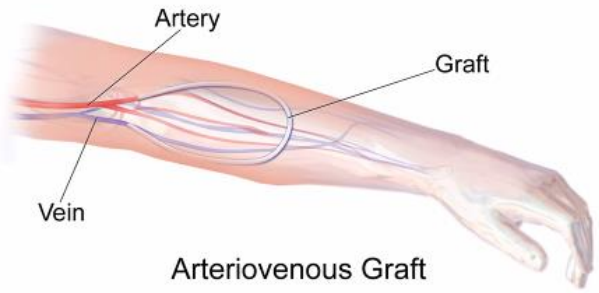
1) Snuffbox
2) Radiocephalic (wrist)
3) Radiocephalic (mid forearm)
4) Brachiocephalic (Elbow)
5) Brachiobasilic + transposition (Elbow)



- NONDOMINANT ARM FIRST
- Most distal first, then work more proximally

The non-ideal fistula

- Long distance between usable vein and artery
- Urgent access
- Short lifespan (months)
- Infections



Arteriovenous Graft

- Non-ideal fistulas are good for patients who need urgent access
- Don't last as long as fistulas – more prone to infections.
- Previously needed a longer time b4 use, but new rapid access grafts available.

The reality of patient veins:

Diabetes

Cardiovascular disease

Obesity

'Line damage'

Phlebotomy damage

- To avoid needling difficulty you can superficialize a deeper lying superficial vein, however this leaves a partially accessible vein with potential kinking @ inflow/outflow which could lead to failure

Post operative care: Role of VA Nurse:

POST FISTULA SURGERY

- Patients may get post surgery complications, such as bleeding, swelling or infection
  - Advised to contact the access nurse as soon as possible
- Fistulas need to be checked for development and maturity 4-6 weeks post surgery, then any issues can be dealt with quickly.
- After this the fistula needs to be checked regularly until the patient starts dialysis
  - If the patient is already on dialysis (may have needed to start via a tunnelled line), the dialysis nurses will check the fistula when the patient attends for their treatment

- Once transplanted – encouraged to keep fistula just in case

Why be interested in vascular access:

- Neglected!! – patients fall between specialties, with no real ownership of the patient's care.
- Lack of evidence for renovascular care.
- Nice mix between the technically challenging and the creative