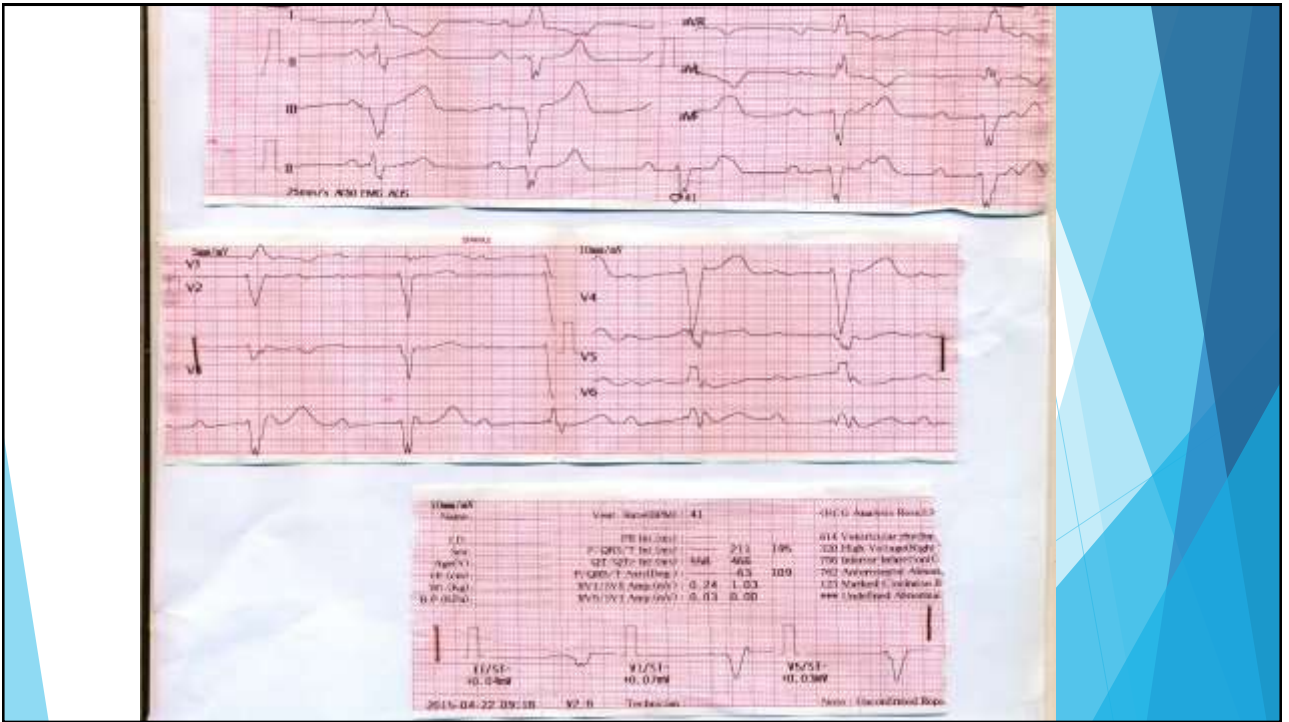


Permanent Pacemaker (Unusual Case Scenario)

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- ▶ 70 year old female patient, **HTN, CKD on dialysis.**
- ▶ Complained of **left arm swelling** with increasing pain.
- ▶ On **Duplex scan** on peripheral vascular system, it was **normal.**
- ▶ During this vascular trip, the patient **collapsed.**





- ▶ Electrolyte testing was done and it was normal



Transvenous temporary pacemaker was inserted through right subclavian vein.

Now, it is planned to implant

permanent pacemaker

for our patient

- With left sided diseased venous system with dialysis shunt.
- And right system occupied with temporary pacemaker.

Here, we have two vascular accesses:

Obstacles with left access (the same site of the shunt)

High pressure (arterialized vein) and so

- higher bleeding risk
- higher incidence of hematoma
- higher difficulty on lead handling with resistance pressure.

High incidence of access complication (thrombosis and/or fibrosis) and so shunt disruption.

Obstacles with right access (not Temp Pace.)

Soon or later the left side is going down and you will need to use the right side and PPM implantation will inhibit the vascular surgeon (totally occluded vein) or decrease the shunt longevity (narrowing of the vessel).

- Permanent transvenous cardiac pacing has traditionally been achieved using vascular access *via the upper limbs through the axillary, subclavian or cephalic veins.*
- Requires *minimal dissection* and is associated with a *low risk of minor complications.*
- This also allows for *placement of the pulse generator in the infraclavicular region*; an ideal location due to its limited movement, accessibility, relative cleanliness and patient comfort.

- ***Venous occlusion or thrombosis*** is not an uncommon finding in patients undergoing device implantation or revision.
- The incidence is estimated to be as high as ***13.7% in de novo implants and 26–64% in system upgrades.***
- While surgical ***epicardial pacing*** via a thoracotomy has been traditionally viewed as the ‘bail-out’ option, it is not preferred due to its invasiveness.
- Epicardial leads also have ***higher pacing thresholds*** and greater incidence of ***lead fractures*** compared with transvenous leads.

8-14-2015

Subclavian Vein Stenosis/Occlusion Following Transvenous Cardiac Pacemaker and Defibrillator Implantation: Incidence, Pathophysiology and Current Management

Subclavian vein stenosis related to an intracardiac device, even when asymptomatic, can lead to problems with lead revision or device exchange.^{2,3} Variable incidence has been reported in the literature, but up to 50% of patients may develop at least moderate subclavian vein stenosis, defined in most studies as a greater than 50% luminal narrowing by contrast venography. Even with more severe luminal narrowing

Options...

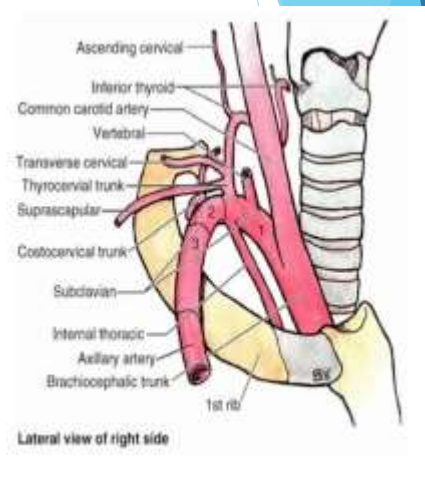
➤ *To do right veno-graphy*

- Negative finding implant in right side
- Positive finding either
 - ✓ Shift to the left side
 - ✓ Or deal with it

➤ *To go to the left side with/without shunt venography*

Right internal jugular access

- Avoiding obstructed left side
- Keeping right subclavian patent
- SVC is wide more capacious, in direct continuity with the inlet access with no or little angles and so little risk of stenosis.



- The *IJV* has been used by surgeons since the *1960s* for placement of permanent pacing leads.
- Its deep location within the neck and its *close relationship to vital structures like the carotid artery, vagus nerve, phrenic nerve and recurrent laryngeal nerve* make it challenging to access using surgical cut-down without causing unintended collateral damage to neighbouring structures.

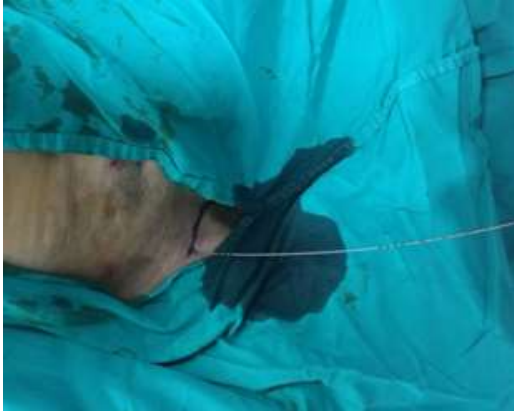
Lower anterior approach US guided





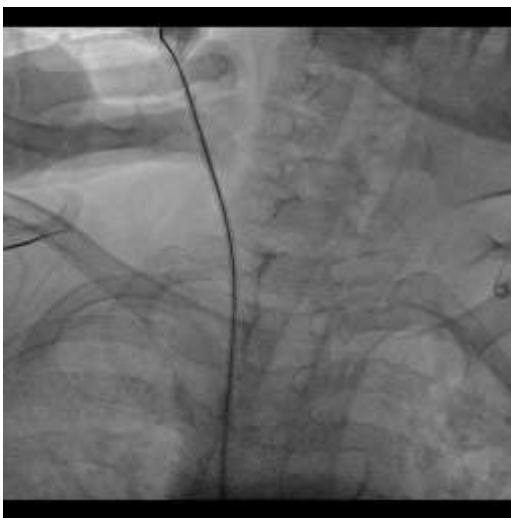
Access incision with tenting technique



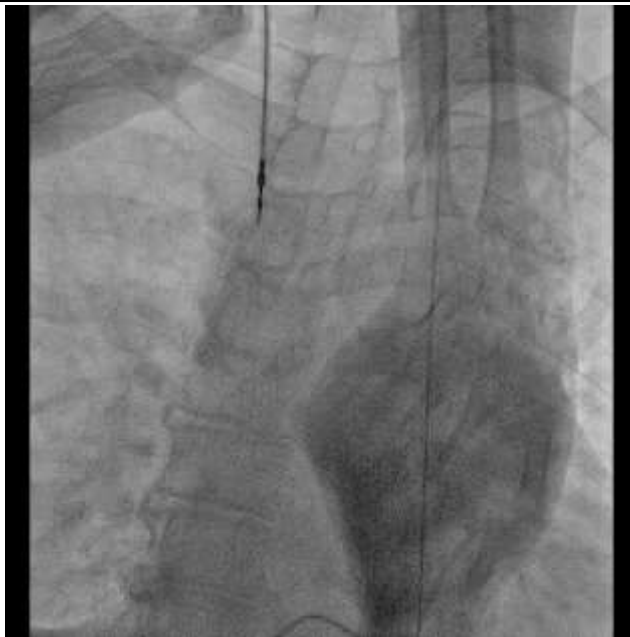


After access incision

On peel away sheath introduction



Lead introduction and positioning



Sleeve fixation (sandwich like)

▶ **Gentle dissection** of the sternomastoid fibers and **keep the sleeve deep** (to avoid skin irritation) with its suturing within the muscle fibers and covered by muscle fibers with caution.



Pocket formation:

- ▶ ***Infra-clav.***
Vs
- ▶ ***Supra-clav.***





Tunneling



Tunneling:

In front of the clavicle
or
Under the clavicle

Passage of the lead through the tunnel

Using Silk threads to pass through the tunnel the tying on end with the lead and withdrawal gently with proper lead fixation

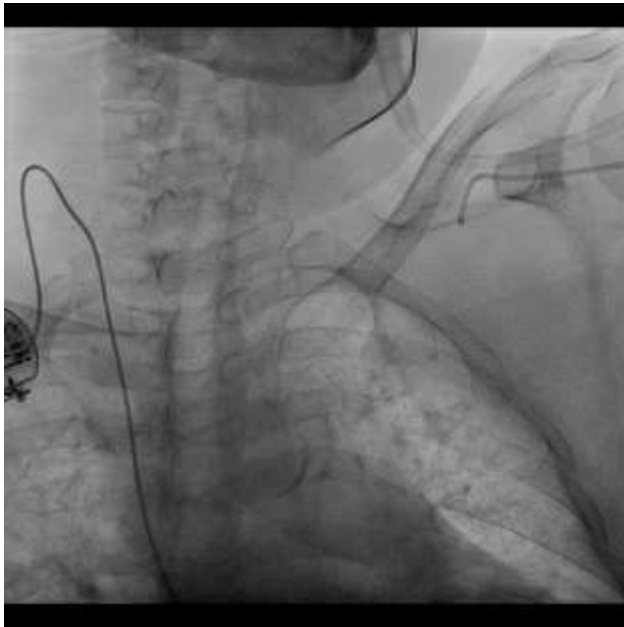
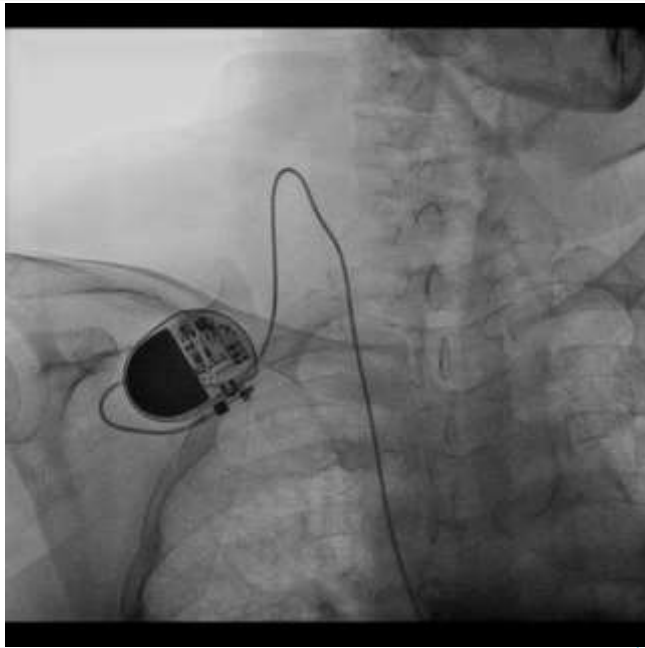


Keep your lead crutch like



Suturing





Conclusion

- Pacemaker implantation is associated with high level of vein stenosis reaching 50%.
- Pacemaker implantation through dialysis shunt is a complicating procedure.
- Jugular vein access carries multiple tricky steps (approach, peel away introduction, tunneling, crutch lead positioning...etc)
- Hybrid team (Ep, anesthesia, vascular surgery) results in better results

Thank
you

