

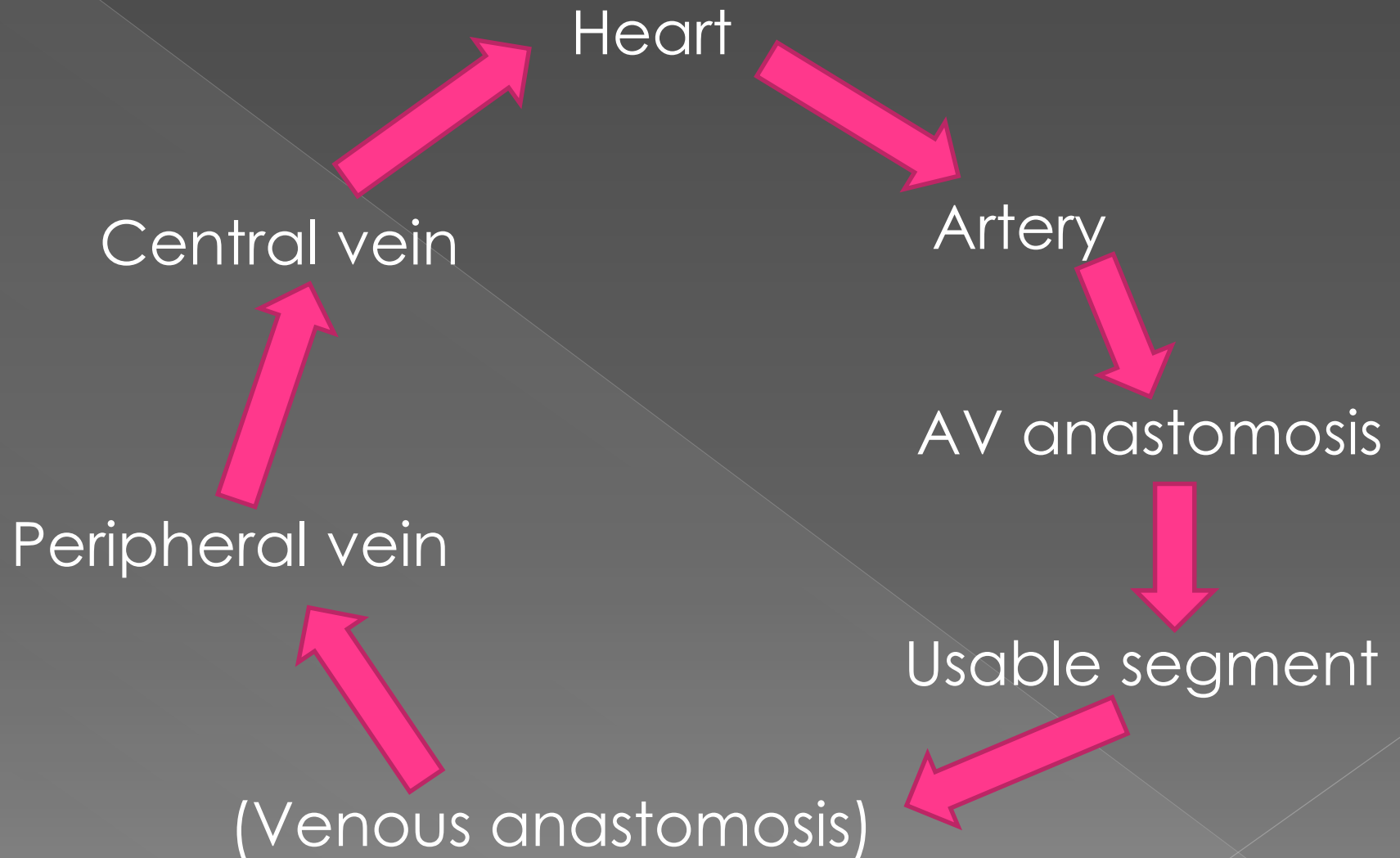


How to manage Central Vein Stenosis

Termpong Reanpang, MD

Division of Vascular and Endovascular Surgery
Department of Surgery, Faculty of Medicine
Chiang Mai University





Outlines

- ◉ Definition of central vein
- ◉ Problems of central vein stenosis (CVS)
- ◉ Causes and mechanism
- ◉ Prevention and reduce CVS
- ◉ Diagnosis of CVS
- ◉ Treatment

Superior
vena cava

Mediastinal

Esophageal

Internal
thoracic

Azygos

Hepatic

Renal

Genital

Lumbar

Common iliac

Internal iliac

External iliac

Vertebral

Internal jugular

External jugular

Subclavian

Brachiocephalic

Axillary

Cephalic

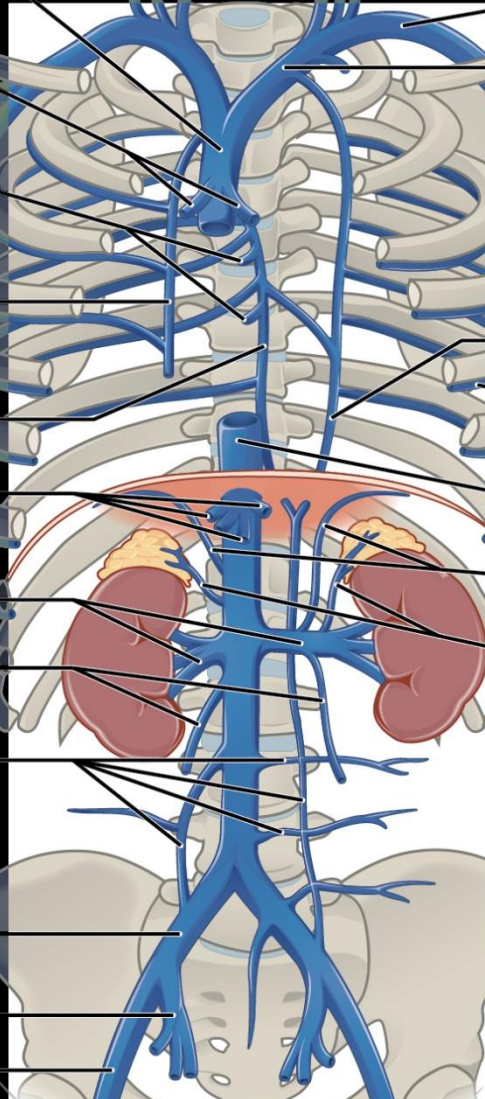
Hemiazygos

Intercostal

Inferior vena cava

Phrenic

Adrenal





Patients	
CVS	Asymptomatic
CVS + high blood flow	Symptomatic
CVS (NS) + high blood flow	Asymptomatic
CVS + rich collateral veins + high blood flow	Asymptomatic

Problems on HD patients

- ◉ Related to VH
 - > Arm swelling
 - > Face swelling
 - > Breast swelling
 - > Pleural effusion
 - > Infection
- ◉ Related to access dysfunction
 - > Tortuosity and dilatation of AVF
 - > Prolong bleeding
 - > Inadequate HD
 - > Thrombosis



Protect Central veins in CKD patient



Causes of CVS

Central vein catheters

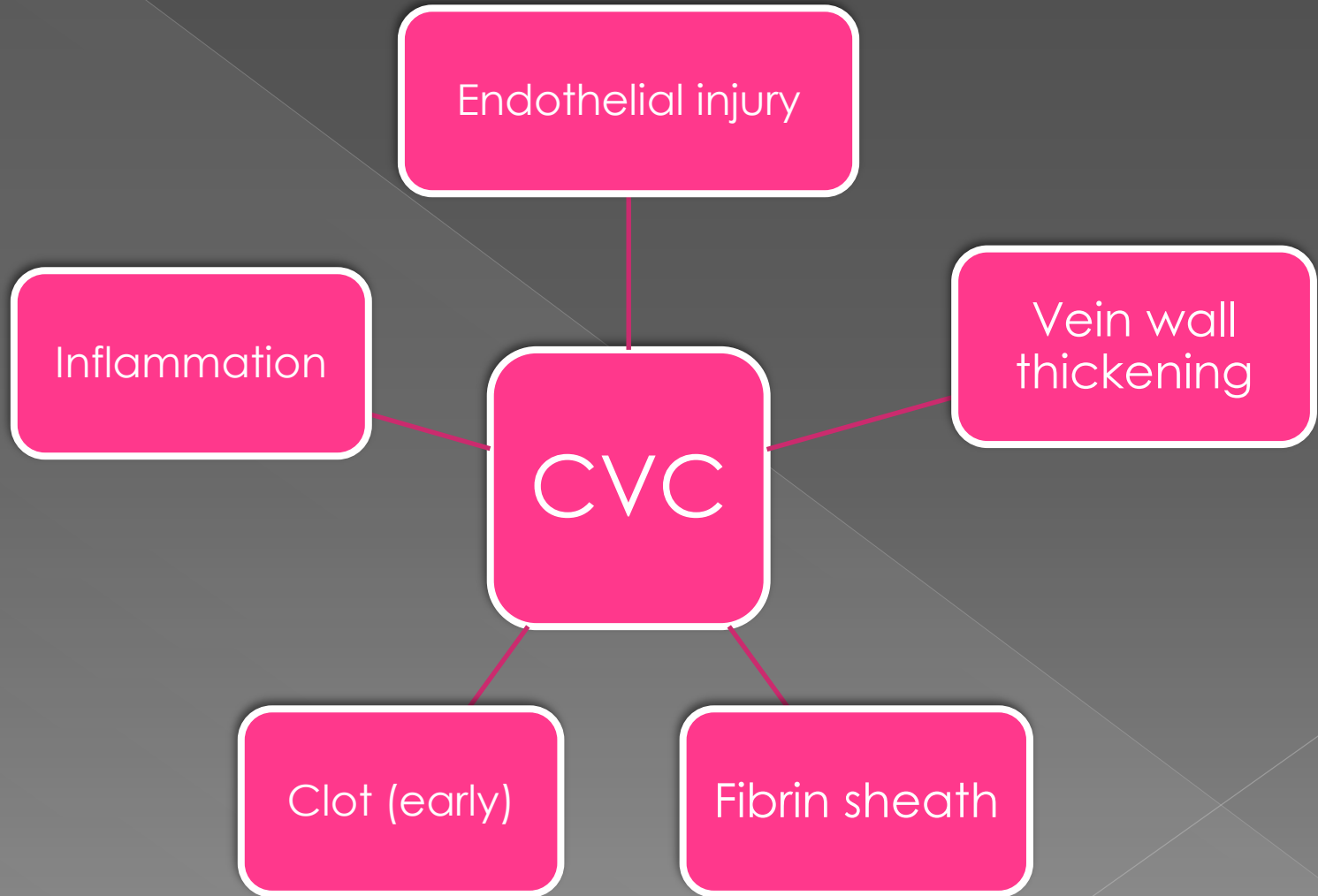
Cardiac rhythm devices

Thoracic outlet syndrome

Fibrosing mediastinitis

Idiopathic

Mechanism





Management of CVS



Prevention of CVS

- No Central vein catheters (CVC)!!!



Prevention of CVS

- Real life

- > In USA 80% of initiate HD with CVC



Prevention of CVS

- ~~⊙ No Central vein catheters (CVC)!!!~~
- ⊙ Early referral to specialist kidney team
 - > Greater choice of treatment options
 - > Reduced need for urgent dialysis
 - > Increased proportion with permanent access
 - > Improved patient survival
- ⊙ Preemptive AVF or Fistula first***

◎ Recommendation for referral

- > GFR < 30 ml/min/1.73 m²
- > Progression of CKD
- > AKI on top CKD
- > Significant albuminuria
- > Urinary red cell casts, RBC > 20 per high power field
- > CKD and HTN refractory to treatment ≥ 4 antihypertensive agents
- > Persistent abnormalities of serum K
- > Recurrent or extensive nephrolithiasis
- > Hereditary kidney disease

Proper use of CVC!!!



How to reduce CVS from CVC

- Prefer Right IJV insertion
 - > Avoid same side of planned or maturing AVF
 - > Subclavian access should be used only when no other upper-extremity options are available.

○ IJV is better than SCV insertion

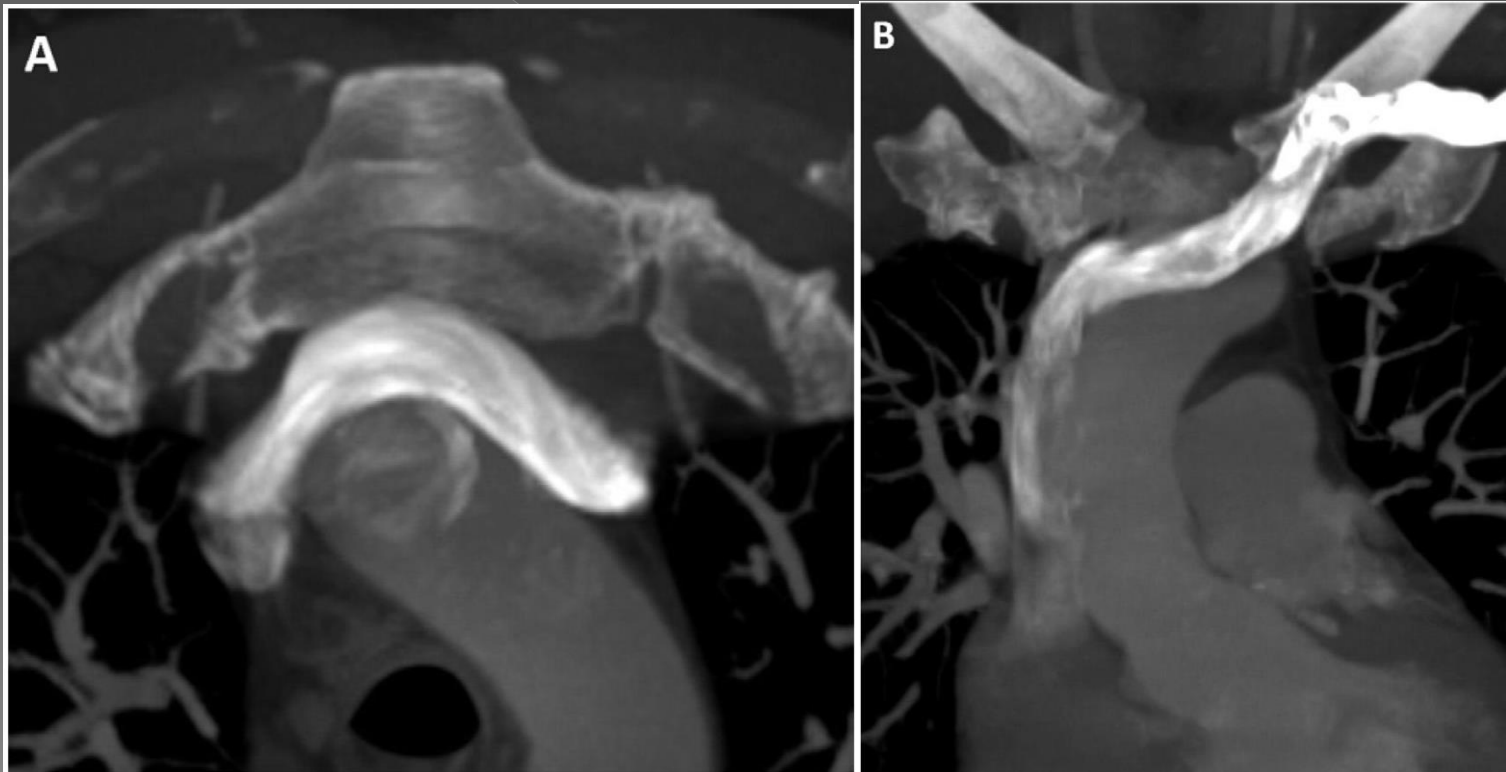
Author, year	SCV occlusion	IJV occlusion
Vanherweghem, 1986	33%	
Spinowitz, 1987	46%	
Barrett, 1988	50%	
Schwab, 1988	26%	
Wanscher, 1988	25%	
Cimochowski, 1990	50%	0%
Schillinger, 1991	42%	10%
Surratt, 1991	43%	
Hernández, 1993	53%	
Salgado, 2004 (right IJV)		0%
Salgado, 2004 (left IJV)		9%

Mickley, V. "Central vein obstruction in vascular access." *European journal of vascular and endovascular surgery* 32.4 (2006): 439-444.

○ Right IJV is better than Left

> Kohl, 2005

- 50% of left IJV catheter develop CVS
- 0.9% of right IJV catheter develop CVS



Kohl KH, Tan C. Central vein stenosis in end stage renal failure patients. *J R Coll Physicians Edinb.* 2005;35:116-122

How to reduce CVS from CVC

- Prefer Right IJV insertion
- Less frequency and duration
 - Remove CVC as soon as possible

How to reduce CVS from CVC

- ◉ Prefer Right IJV insertion
- ◉ Less frequency and duration
- ◉ Use silicone catheter
 - > Less thrombosis
 - > Less CVS
 - > Compare with Polyethylene, Polyurethane and PTFE

How to reduce CVS from CVC

- ◉ Prefer Right IJV insertion
- ◉ Less frequency and duration
- ◉ Use silicone catheter
- ◉ Sterile care of catheter
 - > Infection → increase inflammation and CVS 2.7 times

Hernandez D, Diaz F, Suria S, et al. Subclavian catheter related infection is a major risk factor for the late development of subclavian vein stenosis. *Nephrol Dial Transplant*. 1993;8:227-230.

How to reduce CVS from CVC

- ◉ Prefer Right IJV insertion
- ◉ Less frequency and duration
- ◉ Use silicone catheter
- ◉ Sterile care of catheter

Proper CVC use

How to reduce CVS from AVF or AVG creation

- ESRD 45 yr Male
- Consult for AVF
- HD via Rt IJV cath



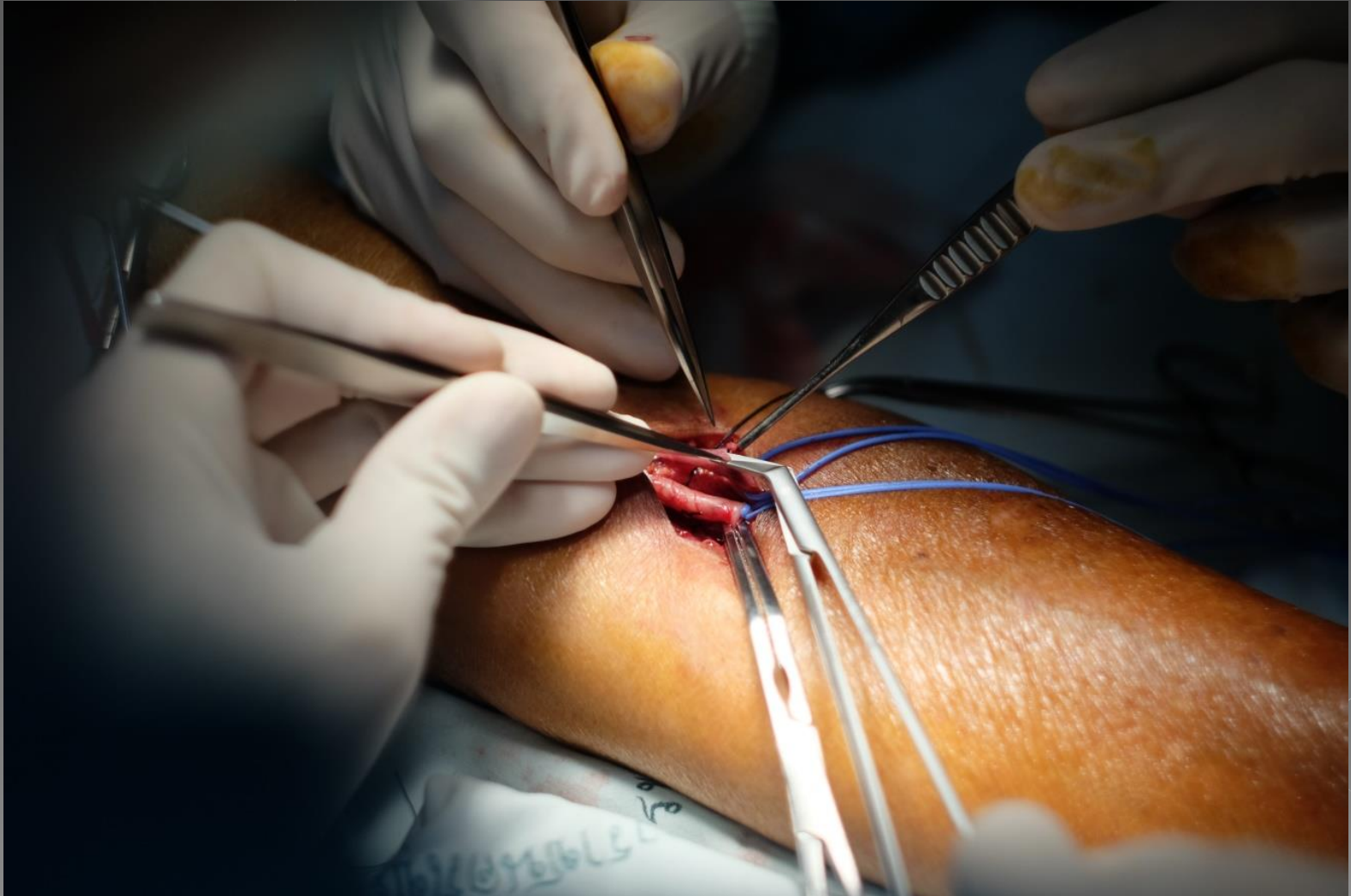
How to reduce CVS from AVF or AVG creation

- Patient who had previous catheter or pacemaker
 - > Central vein evaluation

Central vein evaluation

- Angiography or CTV – refer
- Duplex US
 - > 90% accuracy
 - > No contrast
 - > Preemptive AVF
- MRV (non-contrast)

Diagnosis of symptomatic CVS



Diagnosis of symptomatic CVS

- Patient with AVF/AVG

- > Arm swelling (>2 wk after AVF/AVG creation)
- > Breast swelling
- > Face swelling
- > Collateral veins on chest or neck



Central vein evaluation

Treatment

◉ Conservative

- > Mild symptoms and well collaterals
- > Adequate and smooth HD

◉ Intervention

- > PTA first choice
 - Normal balloon, High pressure balloon
 - Cutting balloon
 - DCB
- > Stent if PTA fails
- > Surgery as second choice

Summary

- ◉ Prevention
 - > Early referral
 - > Proper CVC use
 - > Good planning renal replacement methods
- ◉ Diagnosis
 - > Imaging essential – US often insufficient
- ◉ Looking for cause of CVS
- ◉ PTA first choice
- ◉ Surgery second choice