



Hosted by BC Transplant and the BC Renal Agency

2016

VA Session: A Team-Based Approach to Solving Vascular Access Problems

October 7, 2016

Panel discussion with:

- Dr. Mercedeh Kiaii (nephrologist)
- Dr. Jerry Chen (surgeon)
- Mirita Zerr (vascular access nurse)
- Dr. Brooke Cairns (radiologist)

Learning Objectives:

1. Review 3-4 “challenging” vascular access cases. Panel participants will discuss their perspectives on options for management.
2. Provide a forum for the audience to interact and discuss vascular access related issues.

Case Study #1: High Cardiac Output

Case study #1

- SM a 62 year-old female
- Pyelonephritis
- 1987: Initiation of HD
- Oct 1989: Transplanted; Oct 2004: Graft loss
- Oct 14, 2004; Initiation of dialysis; right IJ cuffed CVC
- Jan 19, 2005 Left BB AVF created; Access flows >2500ml/min
- Two angioplasties in the last year for recurrent axillary/subclavian vein stenosis

Live poll

What would you do if access flow is over 2200ml/min and patient is asymptomatic?

- a) Repeat access flow measurement next run.
- b) Notify nephrologist, dr may order baseline echocardiogram, continue with regular monitoring.

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Case study #1 cont'd...

- March 9, 2015: c/o chronic fatigue

Live poll

What symptoms would you assess for with high output fistula?

- a) Palpitations
- b) Chest tightness/pain , SOB
- c) All of above

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Case study #1 cont'd...

Questions for the panel

- Are there provincial or national guidelines to monitor for high cardiac output?
- What parameters should be looking for when cardiac echoes are performed?
- Nephrologist:** what would be the first thing you order? Does HCO Syndrome develop slowly or immediately after fistula creation? Which medications might you expect to try?

Case study #1 cont'd...

- March 23, 2015: Cardiology consult

Case study #1 cont'd...

Questions for the panel

- How useful are cardiac consults? What are their recommendations?

Case study #1 cont'd...

Investigations reviewed

- Dec 2010: Angiogram - mild calcification of RCA but otherwise no obstructive disease.
- July 2014: Echo. LV and RV minimally dilated. Normal biventricular systolic function. Mild mitral and tricuspid regurgitation. PA systolic pressure of 32 mmHg and right atrial pressure of 8.
- Mar 2014: Holter monitor - normal sinus rhythm with short runs of ectopic atrial tachycardia. Complaints of palpitations corresponded to sinus rhythm and PACs.
- June 2014: MIBI - no evidence of ischemia or infarctions. Normal LV ejection fraction. Unlikely high cardiac output
- Mar 30, 2015: VA clinic appointment – no interventions done having reviewed cardiology consult and on physical examination.

Case study #1 cont'd...

Questions for the panel

- What if access flow increased further to >3000ml/min?

Case study #1 cont'd...

- Oct 5, 2015: L Cardiology follow up appointment - V function improved with angiotensin receptor blocker
- May 6, 2016: Seen in cardiology clinic. ECHO done. LV ejection fraction improved since Oct 2015. Denies shortness of breath and chest pain
- Only complaint is hypotension on HD; 70-80 systolic
- May 25 2016: Cardiology clinic complaining of feeling symptomatic with the angiotensin receptor blockers, being “disconnected” fatigue and drowsy sensation
- Recent MIBI demonstrated normal LV ejection fraction. LV end diastolic diameter did not increase and has a high fitness classification on her exercise MIBI which are not in line with cardiac failure
- Fatigue continues

Live Poll

When would surgical intervention be needed for high cardiac output?

- a) When access flow is $> 4\text{L/min}$
- b) When patient is symptomatic ,uncontrolled by medication, cardiologist consult states avf is impacting function.
- c) When outflow vein is largely dilated and patient requests it is revised.

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Case study #1 cont'd...

Questions for the panel

- What are the surgical recommendations for high CO?
- Surgeon:** How soon would you expect High cardiac output syndrome to develop post fistula creation? Is there a patient population that you've seen that's at higher risk? Have you seen a lot of success with flow reduction procedures or do most patients end up requiring ligation? Because this is fairly rare, is this something you discuss with your patients as a potential risk prior to fistula surgery?

Case study #1 cont'd...

- July 4, 2016: VA consult - positive Branham sign – reduction of heart rate with occlusion of AVF
- July 29, 2016: RUDI performed
- Aug 12, 2016: Access flows 980 ml/min

Case study #1 cont'd...

Questions for the panel

- **Interventional Radiologist:** What role might you play in diagnosing high cardiac output syndrome? Have you worked with or seen any radiological interventions that might be used to treat high cardiac output syndrome (flow reduction procedures)?
- **All:** Has anyone used or tried the MILLER technique?

Case Study #2: Chronic Access Pain

Case study #2

- 40 year-old female
- Renal failure – pyelonephritis
- Allergies:Morphine, Demerol, Codeine, Gravol, contrast dye
- Three previous transplants
- Aug 4, 2010: HD commenced; Right BC AVF; Access flows > 2000ml/min

Case study #2 cont'd...

- Thrombectomies: Aug 2, 2011; Jan 13, 2012; Jan 16, 2012; Nov 24, 2012
- Angioplasties: Jan 31, 2012; July 4, 2012; Sept 28, 2012; Jan 28, 2013; Jun 21, 2013; Aug 26, 2013; Feb 24, 2014; June 16, 2014; Nov 14, 2014; Feb 6, 2015; April 20, 2015; July 27, 2015,
- Infections: Oct 9, 2012; Dec 28, 2012; Jan 22, 2013; Mar 29, 2013

Live poll

What are signs of steal?

- a) Cool extremity, poor distal arterial pulse, pale color, delay capillary refill
- b) Pain on dialysis in hand
- c) Dusky finger tips ,possible ulceration -> necrosis
- d) All of the above

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Case study #2 cont'd...

- Dec 6, 2013 - complaining of pain at venous needle site. No indications as to why.

Questions for the panel

- **Nephrologist (and Mirita):** What studies and tests have you found most effective for diagnosing steal syndrome?
- What population is at highest risk for steal syndrome?
- What medications might you use for nerve pain or ischemic pain?

Case study #2 cont'd...

- Training for Home Hemo March 2014, returned to in-centre dialysis April 1, 2016, unable to return to home due to AVF complications and requirements of hydromorphone.

Case study #2 cont'd...

- Aug 10, 2015: surgical revision (vein patch angioplasty, harvesting right basilic vein in the forearm)

Case study #2 cont'd...

- Nov 10, 2015: Sepsis
- Nov 17, 2015: Complaining of ischemia of right hand with skin breakdown

Case study #2 cont'd...

Questions for the panel

- Chronic access pain is very common amongst HD patients. How can we differentiate what type of pain a person is having muscular, ischemic or neurologic?
- Are there recommendations for chronic pain?
- Are there radiological or surgical procedures that can improve a patient's quality of life in regards to pain?

Case study #2 cont'd...

- Nov 21, 2015 DRIL (Distal revascularization and interval ligation) brachial artery to brachial artery bypass. Only distal revascularization done.
- Jan 22, 2016 – CTA - pain in hand and decreased flows

Questions for the panel

- **Surgeon:** thoughts on effectiveness of RUDI vs. MILLER vs. DRIL vs. banding or ligation? How soon after fistula creation would we expect to see signs? Are there any preliminary tests done prior to fistula creation to minimize the risk of steal syndrome? Do you find steal more often develops in AVG's or AVF's? Upper vs. lower arm accesses?

Case study #2 cont'd...

- April 4: Fistulogram - no abnormalities
- April 12, 2016: Angioplasty
- April 14, 2016: Thrombectomy
- Post thrombectomy constant pain while on dialysis
- April 26, 2016: Angioplasty for perianastomatic stenosis
- May 6, 2016: Sepsis
- July 14, 2016: IV antibiotics
- July 2016: Marcaine injections into AVF for pain relief
- August 10, 2016: Nerve block of ulnar vein – pain diminished while on dialysis and pain free at home (first time in months)
- Sept 6/7: Rescheduled for repeat nerve block Sept 6 and consult with VA surgeon Sept 7th

Case study #2 cont'd...

Questions for the panel

- **Interventional Radiologist:** talk about the importance and a little bit about the procedure of diagnostic testing to confirm steal syndrome? Briefly describe the angiogram/arteriogram? Resting finger pressures? Or other helpful testing? Have you ever seen an IMN or steal occur after an angioplasty to increase flow?
- **All:** Does anyone else use Doppler ultrasound with/without fistula compression to see if flow changes distal to the anastomosis in the artery?
- What surgical/radiological interventions are planned in the future, or are we going to continue to use nerve block injection?

Case study #3: Central Venous Stenosis

Case study #3

- 62 year-old male
- ESRD secondary to diabetes
- Dialysis commenced 1982
- Renal Tx x 3 (1984, 1986, 1989), not suitable/eligible anymore

Case study #3 cont'd...

Medical History:

- Type I diabetes from age of 5
- Longstanding severe peripheral vascular disease with multiple lower extremity angioplasties, stenting, toe amputation
- CAD

Case study #3 cont'd...

Vascular Access History:

- No VA Hx available 1982-1999
- L R-C AVF 1999 – failed 1999
- L B-C AVF 1999 – failed 2003
- R R-C AVF 2003 – failed 2003
- R B-C AVF 2003 – failed 2004
- R B-B AVF 2004 – failed 2009
- L B-B AVF 2009 – failed 2010
- Multiple R and L IJV tunnelled CVCs (more than 6 between 1999-2013)
- Translumbar vein tunnelled CVCs x 3 2013-2015

Live poll

How may a patient with SVC syndrome appear?

- a) Collaterals along fistula
- b) Swollen arm, neck, side of face and hoarseness
- c) Headache, SOB and distorted vision
- d) B & C

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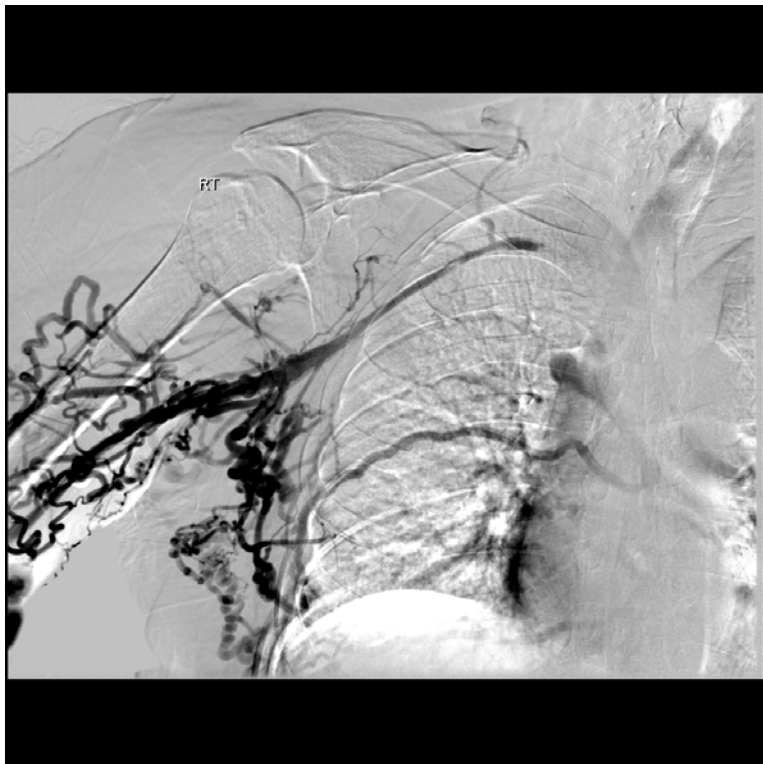
Case study #3 cont'd...

Questions for the panel

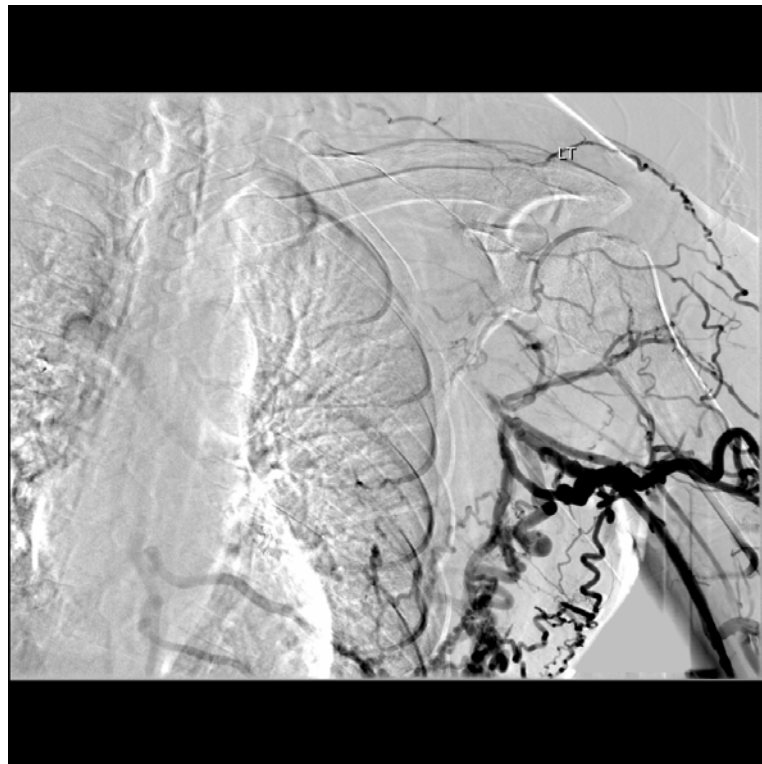
- What are characteristic of SVC syndrome?
- Would or is surgical repair ever be done?
- What is the preferred diagnostic tool to confirm the diagnosis?

Case study #3 cont'd...

- Multiple VA investigations and interventions (angioplasties, Sx revisions)
- Feb 2010 - Multiple venous occlusions. No right internal jugular or subclavian. Left subclavian occlusion. Very difficult insertion of left internal jugular permcath, likely collateral vein. Difficult to advance wires into SVC. Eventually successful. Likely needs groin access in future.
- Mar 2014 - CT angiogram chest: confirms occlusion/severe stenosis of internal jugular, subclavian and innominate veins bilaterally. Severe SVC stenosis.
- IVC occlusion noted during HeRO placement Sx in Aug 2015



Rt arm



Lt arm

Case study #3 cont'd...

Questions for the panel

- If the SVC syndrome were caused by CVC induced thrombosis can it be treated medically?

Live poll

Does the size of CVC play a role in developing SVC thrombus or obstruction?

a)Yes

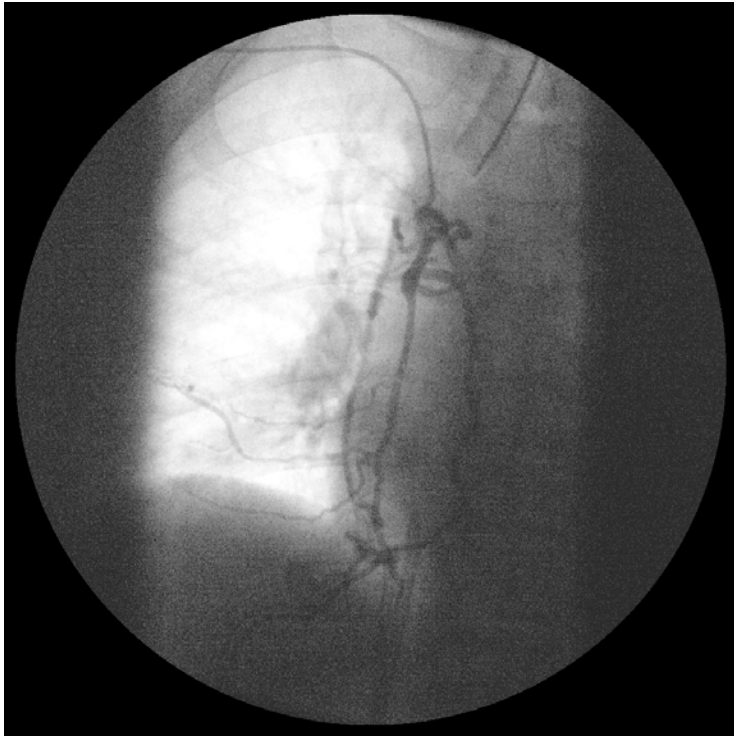
b)No

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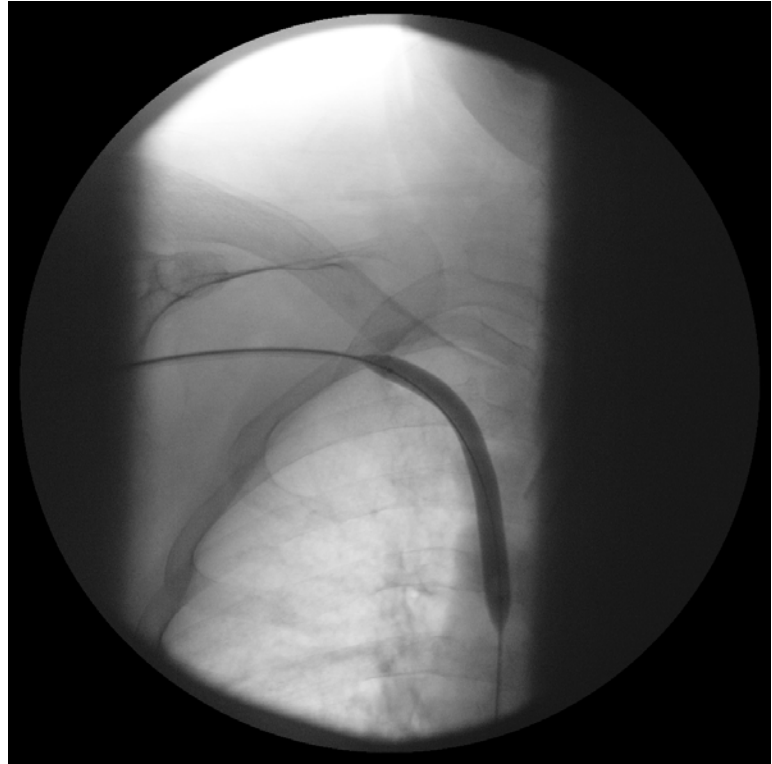
Case study #3 cont'd...

- Aug 2015 - R sided HeRO device placement with R upper arm PTFE graft from brachial artery to HeRO device:
 - 1st use Sep 2015
 - Baseline transonic access flow 1,400 ml/min
 - PTA of in-graft stenosis x 2 (May and Jul 2016)

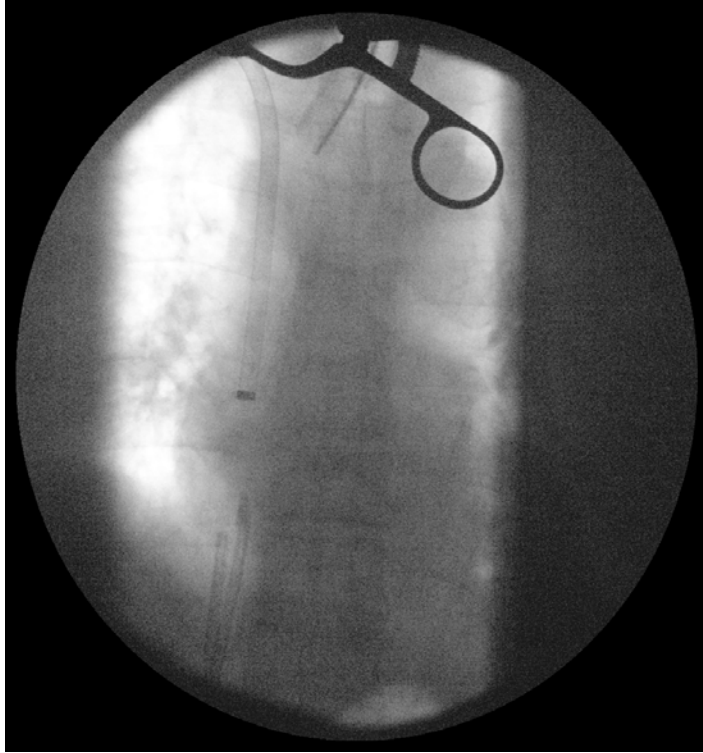
HeRO



- SVC during Hero insertion



- Recanalization and plasty of Rt.



Hero insertion



- Graft to brachial artery



- Graft to Hero catheter