Venoplasty of Superior vena cava and creation of hemodialysis access, a challenging case

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Disclosure

Speaker name: Dr. Avdullah Qafani
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I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

- I do not have any potential conflict of interest
Introduction

This case study illustrates the multidisciplinary assessment and management approach applied by vascular and endovascular units in our institute for management of patient suffering from:

Complete obstruction of Superior Vena Cava, along with poorly functioning hemodialysis access inserted through right subclavian vein.
Clinical history

53 years male

- Diabetes Mellitus
- Hypertension
- Diabetic nephropathy
- Chronic renal failure on hemodialysis
- Diabetic retinopathy
- Glaucoma (operated)
- Old CVA on right occipital region (recovered)
- Peripheral artery disease (left big toe amputated)
Clinical Presentation

- Shortness of breath
- Chest pain
- Swelling in face, neck and upper chest
- Difficulty to perform efficient hemodialysis due to low flow in permanent catheter inserted through right subclavian vein.
CT pulmonary angiogram was done before the procedure, showed complete obstruction of VCS.

STUDY DATE: 24th December 2014
Optimal pre-operative workup and optimization of treatment plan is essential for an excellent outcome, especially in patients with failure in AV fistula (left brachiocephalic), along with SVC obstruction requiring a new fistula access creation.
Patient clinical condition

Patient was admitted under the vascular care and referred to medical team, respectively reviewed the past and present medical history and issues. It was identified that he had long standing DM on Insulin 12 IU s.c bd, Vidagliptin 30 mg od?, HTN on Amlodipine 5mg bd, Lasix 40mg bd, Aspirin 100mg od, CRF, ESRD on hemodyalisis 3x weekx4 hr x 1year. The CVA (3 years old) recovered. on Atorvastatin 40mg od, PAD left big toe was amputated,

Also known case of SOB, facial flushing, chest pain, neck swelling, congested neck veins, difficulties in dialysis due to poor flow in permanent catheter, elevated levels of creatinine, urea and K.
Vascular clinical examination

On examination:
BP 180/90 mmHg, P 94/min. T 36.2 C. facial flushing, neck swell, congested neck veins.

- Absent pulses in upper limbs over radial and ulnar arteries.
- Present Doppler signals over both radial and ulnar arteries.
- Absent pulses over pedal arteries in both legs.
- Present Doppler signals over left ADP and ATP.
- Absent Doppler signal over right ADP and very weak over ATP.
- ECG: sinus rhythm
Laboratory investigation

HBsAG negative, HIV Ag/Ab negative, calcium 9.2mg/dl, HBA1C 7.6%, troponin 0.21 ng/ml, albumin 3.7 g/dl, alkaline phosphate 73U/L, ALAT 10U/L, bilirubin T 0.3 mg/dl, TP 7.5 g/dl, globulin 3.8 g/dl, CPK 70U/L, CKMB 5U/L, WBC 7.8 X 10^3/UL, RBC 3.85X10^6/UL, Hgb 9.9 g/dl, HCT 31.4%, Platelet count 180X10^3 /UL, glucose R 246 mg/dl, PT 14.5 sec, INR 1.09, APTT 40.9 sec, dimer test 1.54 mg/L, creatinine 9.1 mg/dl, CL 101 mmol/L, CO2 21.3mmol/L, K 5.8 mmol/L, sodium 137 mmol/l, urea 105 mg/dl
Pre – procedure (Diagnosis)

The initial assessment plan required multiple laboratory test and procedures including conventional venography of both upper limbs and central veins to evaluate both upper limb veins and central veins and possibility of significant stenosis or total occlusion.

Results of the overall evaluation revealed complete SVC occlusion along with left subclavian vein significant stenosis and its obstruction at central part. Brachial vein was the only vein presented in left upper limb at arm level.
Pre procedure – Right arm
Pre procedure – left arm
Pre – procedure (evaluation)

The findings of the venography assessment were reviewed by interventional radiologists and vascular surgeons and decision was taken for a 2 stage procedure:

1. **Balloon Venoplasty and stenting of left subclavian vein, right subclavian vein, innominate vein and SVC.**
2. **Exchange of hemodialysis permanent catheter in right subclavian vein.**
3. **Creation of new Brachio-axillary GRAFT AV fistula in left upper limb.**
Procedure

1. Procedure was done under local anesthesia. Both jugular veins were thrombosed.
2. A US guided access was done through both femoral veins and distal part of left subclavian vein.

Patient underwent venoplasty of left subclavian, right subclavian, innominate vein and SVC with balloon and stenting in same session.
Balloon venoplasty

STUDY DATE: 25th February 2015
Balloon venoplasty

STUDY DATE: 25th February 2015
Stenting

STUDY DATE: 25th February 2015
Ballooning post stenting

STUDY DATE: 25th February 2015
Post

STUDY DATE: 25th February 2015
Post – PERM cath insertion

STUDY DATE: 25th February 2015
Control venography proved a satisfactory result with complete recanalization of central veins and SVC with good flow. Inflow and backflow in newly replaced catheter showed superb result.

Swelling in face, neck and upper chest showed significant subside immediately after the procedure. Patient felt better, shortness in breath was disappeared. One day after venoplasty, patient had a hemodialysis session revealing an excellent catheter flow resulting in a considerable improvement of dialysis quality.
Surgery

Two days after venoplasty:
Operation was performed under regional anesthesia with axillary block, and axillary GRAFT AV fistula was created.
Two incision were attempted, one in cubital fossa and another in axillary grove.
Brachioaxillary graft fistula performed using a 4-6x40mm graft.
His recovery lacked any major complication.
Post operative

• On first post-operative day, good trill was present at left upper limb.
• Aspirin 100mg od was discontinued and he was discharged on Plavix 75mg od and Warfarin 3mg od. Patient was in good general condition, symptoms of SVC syndrome were missing, good flow in permanent catheter in right subclavian vein and good trill at left upper limb were present.
Post surgery
Follow up venogram right arm
Follow up venogram left arm

STUDY DATE: 25th May 2015
Follow up venogram left
Follow up venogram – Balloon Angioplasty
Follow up venogram – post venoplasty

STUDY DATE: 25th May 2015
Follow up venogram – post venoplasty
2\textsuperscript{nd} Follow up venogram

STUDY DATE: 12\textsuperscript{6}h November 2015
2\textsuperscript{nd} Follow up venogram

STUDY DATE: 12\textsuperscript{6}h November 2015
2\textsuperscript{nd} Follow up venogram
Discussion and conclusion

-This case demonstrates the value of collaborative, multidisciplinary assessment and management for a patient seeking hemodialysis access creation.

- Careful review of the patient’s medical history and current status guided the plan for a comprehensive pre-operative evaluation.

- Consideration of results and treatment of underlying condition such as SOB, neck and facial swelling, lacking optimal flow in permanent catheter prior to surgical intervention is key to achieve best outcome.
In this case, patient presented with failed left brachiocephalic fistula which manifested as thrombosis of fistula and insufficient quality of dialysis due to low flow at right subclavian vein catheter.

The multidisciplinary assessment provided an opportunity to efficiently address the issues that potentially impact surgical success, providing this patient with an opportunity to achieve the best possible outcome.
Thank you for your attention
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