Infected Internal Jugular Vein Thrombus in a Case of Infected Arterio-Venous Fistula for Dialysis Access

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Infected internal jugular vein (IJV) thrombus is rare and is sometimes seen in association with jugular vein catheterization and rarely with suppurative upper aero-digestive tract infection. We describe a very rare association of left infected internal jugular vein thrombus with an infected arterio-venous fistula in the left elbow region created for dialysis access in a renal failure patient. The infected arterio-venous fistula was addressed surgically by excision and a reverse saphenous vein graft was placed between proximal and distal brachial artery just above it’s bifurcation. The patient was put on i.v Clindamycin and Metronidazole for six weeks. Patient recovered uneventfully.

Keywords: internal jugular vein, chronic kidney disease (CKD), arteriovenous fistula

Introduction

Internal jugular vein (IJV) thrombosis, associated with suppurative infection of the upper aero-digestive tract was first described a century ago. However, IJV thrombus associated with an infected arterio-venous fistula for haemodialysis is hitherto unreported. This article describes a case of infected IJV thrombosis secondary to an infected arterio-venous fistula created for haemodialysis access in left upper limb in a thirty one year old gentleman.

Case Study

A thirty one year old gentleman, a known patient of Chronic Kidney Disease (stage IV), presented with tender, soft swellings in vicinity of the site of left brachio-cephalic Arterio Venous (AV) fistula created for vascular access for Haemodialysis (Fig. 1). This was associated with a left sided painful neck swelling, fever, painful deglutition and anorexia. On examination the gentleman was febrile, had tachycardia and had three pulsatile swellings in left upper limb (largest one [2.5 × 2 cm] at the site of the previous AV fistula and two other smaller [=1.5 × 1 cm each] swelling along the course of the cephalic vein). The swellings were tender with signs of cellulitis. Urgent Doppler ultrasound confirmed the clinical suspicion of pseudo aneurysm involving the anastomotic site. This gentleman also had a left sided, tender, erythematous, diffuse neck swelling (extending from midline to the left sternomastoid muscle and the level of the angle of mandible to the suprasternal notch) (Fig. 2). Intraoral examination revealed no obvious source of infection. Routine investigations showed a Total Leukocyte Count (TLC) of 24000/cmm, C Reactive Protein-250 mg/dl and Serum creatinine 6 mg/dl. Colour Doppler of neck showed a thrombus in left IJV subclavian vein junction with partial obstruction of flow (Fig. 3). The gentleman was admitted and started with intravenous clindamycin 600 mg six
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hourly and metronidazole 400 mg eight hourly, after sending one blood culture which turned out to be negative. He was taken for emergency surgery for the pseudo aneurysm repair. The brachial artery, proximal and distal to the aneurysms was dissected. A reverse saphenous vein graft (through a subcutaneous tunnel made on the medial aspect of the arm) was used to bypass the aneurysmal segment of brachial artery. Next, the aneurysmal segment was explored and a 2.5 × 2 cm leaking infected pseudo aneurysm was found arising from the brachial artery proximal to the bifurcation, at the site of fistula. This pseudo aneurysm was explored, the hematoma along with pus was evacuated and infected portion was excised after proximal and distal ligation. The other two venous swellings (≈1.5 × 1 cm each) proximal to the pseudo aneurysm were explored and found to be arising from the arterialized inflamed cephalic vein. They were excised and vein ligated with 3-0 polypropylene sutures. The excised tissues were sent for culture which yielded Staphylococcus aureus. Following surgery the left hand was warm and both radial and ulnar pulses were palpable. Post operatively the same intravenous antibiotics were continued for 3 weeks followed by same oral regimen (clindamycin and metronidazole), for another 3 weeks. Unfractionated Heparin was given for 3 days overlapping with oral ecosporin. Serial haemodialysis through a femoral haemodialysis cannula continued in the post operative recovery period. Twenty four hours post-operatively the patient showed marked subjective wellbeing, decrease in throat pain, improved appetite, along with resolution of fever and decrease in size of the left sided neck swelling and partial resolution of cellulitis in the neck with good wound healing in arm. Patient was discharged after one week with near complete resolution of left sided neck swelling, a TLC of 6800/cmm, serum creatinine of 3 mg/dl. On the 6th week follow up, the patient was asymptomatic and review Doppler ultrasound showed partial resolution of IJV thrombus.

**Discussion**

Infected IJV thrombus extending from oropharyngeal infection was described first in 1936 by Lemierre as Lemierre syndrome. The incidence of IJV thrombosis after proximal and distal ligation. The other two venous swellings (≈1.5 × 1 cm each) proximal to the pseudo aneurysm were explored and found to be arising from the arterialized inflamed cephalic vein. They were excised and vein ligated with 3-0 polypropylene sutures. The excised tissues were sent for culture which yielded Staphylococcus aureus. Following surgery the left hand was warm and both radial and ulnar pulses were palpable. Post operatively the same intravenous antibiotics were continued for 3 weeks followed by same oral regimen (clindamycin and metronidazole), for another 3 weeks. Unfractionated Heparin was given for 3 days overlapping with oral ecosporin. Serial haemodialysis through a femoral haemodialysis cannula continued in the post operative recovery period. Twenty four hours post-operatively the patient showed marked subjective wellbeing, decrease in throat pain, improved appetite, along with resolution of fever and decrease in size of the left sided neck swelling and partial resolution of cellulitis in the neck with good wound healing in arm. Patient was discharged after one week with near complete resolution of left sided neck swelling, a TLC of 6800/cmm, serum creatinine of 3 mg/dl. On the 6th week follow up, the patient was asymptomatic and review Doppler ultrasound showed partial resolution of IJV thrombus.

**Discussion**

Infected IJV thrombus extending from oropharyngeal infection was described first in 1936 by Lemierre as Lemierre syndrome. The incidence of IJV thrombosis...
is uncertain. It is reported that incidence of ultrasound or autopsy detected IJV thrombosis due to IJV catheters in situ is 66%, and also about one third of patients having a neck dissection will have IJV thrombus. The increased incidence probably is due to more placement of central venous catheters in IJV and subclavian vein, and usage of the IJV by intravenous drug abusers. IJV thrombosis is caused by 3 factors—endothelial damage, stasis and hypercoagulable state. In our case, one of the explanations, though difficult, is probably due to infected emboli from the infected arterio-venous fistula seeding the endothelium of the subclavian-IJV junction. The other explanation could be undetected oropharyngeal infection leading to IJV thrombosis secondarily causing the infected pseudoaneurysms.

Presentation of IJV thrombosis differs depending on whether it is infected (complicated) or not infected (uncomplicated). Non-infected cases present with painful chord like structure in neck. Infected cases, on the other hand present with mild pain, tenderness and fever. In one study involving a large series of patients with septic IJV thrombosis, Tovi, et al. found the following variation in presentation—fever (83%), leucocytosis (78%), cervical pain (66%), neck swelling (72%), cord sign (39%), sepsis syndrome (39%), pleuro-pulmonary complications (28%), superior vena cava syndrome (11%), chylothorax (5%) and jugular foramen syndrome (6%).

Ultrasound scan is safe, non-invasive and cost-effective tool for confirmation of diagnosis but may be inaccurate in detecting thrombosis deep to the mandible and clavicle. Many consider CT scan with intravenous contrast to be the study of choice. MRI is better regarding soft tissue definition and sensitivity to blood flow rates than CT. Culture from the source of infection (oropharynx, ears, catheter tip etc.) and blood cultures are required in complicated IJV thrombosis. Investigations like protein C, S and antithrombin-3-deficiency tests and Disseminated Intravascular Coagulation (DIC) screening are required to rule out coagulopathy in Uncomplicated IJV thrombosis.

Medical treatment differs in infected and non-infected IJV thrombosis. In non-infected thrombosis, anticoagulation (in presence of procoagulative state) and causative factors removal (e.g. Central venous catheter) are done. Safety of thrombolytic therapy has not yet been established due to inadequate number of case series.

In infected IJV thrombosis, the primary site of infection should be treated first. Antibiotics alone may be remedial in most patients. The choice of antibiotic depends on the causative organism. In IJV thrombosis caused by an indwelling catheter the most likely organism will be gram positive and Vancomycin should be used empirically until the culture/sensitivity report is available. All patients with infected thrombosis should get 4 to 6 weeks of antibiotic therapy. Clindamycin can be used instead of Vancomycin along with Metronidazole in renal compromise. Surgery should be done if there is associated deep space neck infections, intra-luminal abscess, carotid sheath involvement and failed medical treatment. Surgical procedures described include drainage of collections, debridement of necrotic tissue and even ligation or excision of the IJV.

**Conclusion**

An infected IJV thrombus is a serious clinical condition with overt manifestation and should not be difficult to diagnose. Extirpation of the source of infection along with long term appropriate antibiotics appears to be the treatment of choice. We describe a very rare case of infected Internal Jugular Vein thrombus in a case of infected arterio-venous fistula for dialysis access in left upper limb successfully managed with this regime.

**Disclosure Statement**

All authors have no conflict of interest.

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