

Case Report

Iatrogenic Superior Vena Caval Syndrome

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Abstract

The superior vena caval (SVC) syndrome is a common oncological emergency requiring the quick initiation of appropriate therapy. However, it may also result from a medical procedure e.g. central catheter or temporary pacing wire insertion, with symptoms usually developing acutely and dramatically. If symptoms persist despite removal of the offending device, chemotherapy and radiotherapy are obviously precluded. Alternative treatment modalities include thrombolysis, thrombectomy devices, stents, and surgery. Clinically covert thrombosis is not uncommon, and as interventions and invasive procedures requiring central venous cannulations become commonplace, this iatrogenic complications will inevitably occur more often. Even the use of ultrasound guided insertion does not avoid catheter related obstruction. A case of an iatrogenic haemodialysis catheter related SVCS is presented and the aetiopathogenesis, signs and symptoms, diagnosis, and management are discussed.

Introduction

Superior vena cava syndrome (SVCS) is a common oncological emergency and amongst the most dramatic clinical events encountered in clinical practice. However, as more and more interventions and invasive procedures requiring central venous cannulation become commonplace, iatrogenic SVCS represents a new entity with important diagnostic and therapeutic considerations.¹

Case Report

A 44 year old man was admitted with ten days' history of swelling of the face and shortness of breath. He had a past history of renal calculi, hypertension, and autosomal dominant polycystic kidney disease. Since

December 1998 he was on maintenance haemodialysis for end stage renal disease. Because of repeated arteriovenous fistula failures, he had required multiple subclavian cannulations for haemodialysis catheters.

On examination, he was haemodynamically stable with respiratory rate of 16, appeared pale, had distended non-pulsatile neck veins, facial puffiness and periorbital oedema but no dependent oedema or stridor. Local examination revealed prominent dilated tortuous veins over the upper chest, positive Pemberton's sign, and multiple scar marks at both subclavian sites; evidence of previous central venous cannulations. Remaining systemic examination revealed no abnormality.

The patient was investigated for possible iatrogenic SVC obstruction due to thrombosis from repeated haemodialysis catheter insertions. Upper limb venography demonstrated inability of the catheter to pass beyond the proximal superior vena cava. There was no passage of dye beyond the subclavian veins but multiple tortuous veins forming collaterals around the scapula and anastomoses with the azygous system were evident, which confirmed the diagnosis. The patient was referred for a cardiothoracic surgical opinion, but was deemed at too high risk for a bypass procedure. He was started on unfractionated heparin and warfarin. Over the following months there was gradual improvement in the upper extremity swelling. The patient declined follow-up venography.

Discussion

Up to 95% of all cases of SVCS occur secondary to a malignant disease, with lung cancer responsible for more than 70% of cases and lymphoma a distant second.² However, a benign aetiology can account for as many as 20% of all cases of SVCS.^{2,3} Iatrogenic SVCS has been reported with various central venous catheters including Hickman lines, tunnelled catheters, haemodialysis

catheters, Swan-Ganz catheters, radio-frequency ablation catheters and transvenous pacemaker wires.¹⁻³ The symptoms of SVCS arise from the impediment of blood flow through the SVC to the right atrium. In classical SVCS, the signs and symptoms can be subtle and evolve slowly over a 2 to 5 week period owing to a gradual and progressive reduction in venous return. Severity of the syndrome depends on the location and rapidity of onset of obstruction; the more rapid the onset, the more severe the symptoms as the collateral veins do not have time to distend to accommodate the increased blood flow.^{3,4} Iatrogenic SVCS usually presents with acute occlusion of the SVC with consequent rapid development of symptoms. Complications such as acute respiratory failure following central vein catheterization have been reported.⁴

The incidence of clinically overt upper limb deep venous thrombosis (DVT) related to intravenous catheters is reported between 0.3% and 28.3%; with venography the incidence rises to between 27% and 66%.⁵ The incidence of DVT with dialysis catheters as diagnosed with ultrasound has been reported as high as 20.8%.⁵ The risk of catheter-related thrombosis varies according to site of insertion; the subclavian route carries the lowest risk; internal jugular insertion has approximately four times higher risk.⁶ The frequency of this complication and its clinical importance remains undefined — although all thromboses have the potential to embolize — and this leads to variation in the use of thromboprophylaxis. In one review, thromboprophylaxis with low-dose heparin led to a significantly lower risk of catheter-related venous thrombosis.^{5,6}

Management options of an occluded SVC due to a thrombus include thrombectomy with thrombolysis using rTPA, streptokinase or urokinase; pulse spray thrombolysis using heparinised saline; mechanical thrombectomy devices (e.g. Amplatz®, AngioJet®, Arrow-PTD®, Cragg TB®), and pharmomechanical thrombolysis. Percutaneous transluminal angioplasty, stent placement with self-expanding endovascular wallstent, and surgery consisting of

endarterectomy or bypass procedures have also been successful.^{1-3,7-9}

Conclusion

Central venous catheters are invaluable in allowing measurement of haemodynamic variables and allow the delivery of medications and nutritional support. Unfortunately, their use is associated with adverse events — mechanical, infectious, and thrombotic complications.

Iatrogenic complications can occur with any procedure and one needs to be aware of all possible hazards including the acute iatrogenic SVCS, and ensure immediate diagnosis and prompt relief if any complication does ensue. In iatrogenic SVCS this may consist of simply removing the culpable foreign body i.e. the catheter, which usually results in prompt relief of symptoms. Though there are no guidelines or statements regarding prophylactic thromboprophylaxis, it may be worth considering depending on the individual patient and risk benefit analysis.

References

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