Case Report 2

Endovascular treatment for acute pulmonary embolism in neurological patient

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Abstract

Among the spectrum of venous thrombo-embolic disease, acute pulmonary embolism accounts for the most life threatening manifestations with mortality exceeding 50%. It can affect many patient populations across various disciplines, hence immediate attention and aggressive treatment is crucial. With the advancement of technologies, various catheter-based devices are available to treat massive or submassive PE. In this paper we report two patients of acute pulmonary embolism with neurological issues where the life threatening emergency was successfully managed by utilizing endovascular directed thrombolytic reperfusion therapy.

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Introduction

Although systemic thrombolytic therapy is the standard treatment of acute massive (MPE) and submassive pulmonary embolism (SPE) but it is associated with significant bleeding risk. Reports of catheter directed thrombolysis (CDT) suggest favourable outcomes in patients with MPE and SPE. [1] CDT offers the advantages of rapidly restoring cardiopulmonary haemodynamics, reducing acute mortality and avoiding long-term morbidity. We report two patients in whom life threatening emergency was successfully managed by catheter directed thrombolytic reperfusion therapy in the presence of contraindications to systemic thrombolysis.

Case 1

22 year old male, (Body Mass Index 34) diagnosed as Guillian-Barre Syndrome was on treatment with plasmapheresis. He became hemodynamically unstable on 5th day of hospitalization. Electrocardiograph showed sinus tachycardia. Echocardiography showed hypokinesia of the right ventricle and moderate tricuspid regurgitation with pulmonary artery systolic pressure (PASP) of 45mmHg. The patient continued to be hypoxemic, hypotensive and suffered a cardiac arrest. The patient was taken for pulmonary angiography with the intention to diagnose as well treat PE in the same setting. After confirming the diagnosis, mechanical fragmentation of the embolus was done, followed by intralesional urokinase. Over the next 24 hours, hemodynamic parameters gradually improved with reduction in PASP to 27mmHg. Gradually he was weaned from the mechanical ventilator and was discharged on oral anticoagulants. On six months follow up, muscle power improved to 4/5 in all limbs.

Case 2

63 year old diabetic, hypertensive male underwent decompressive craniotomy for malignant right middle cerebral (MCA) infarction. On the 4th post operative day he developed acute chest pain and shortness of breath. He was haemodynamically stable. Electrocardiogram revealed sinus tachycardia with S1Q3T3 pattern. Echocardiography showed hypokinesia and dilatation of the right ventricle with PASP of 45mmHg. Pulmonary angiography was confirmatory for submassive embolism. Mechanical breakdown and intralesional thromolysis with urokinase was accomplished. At time of discharge his GCS was E4M5V6 with left hemiplegia, on oral anticoagulation. After three months his modified Rankin scale (mRS) was 2 and cranioplasty had been done.

Discussion

Since the first description of embolectomy catheter in 1971 the clinical application of catheter based interventions in the management of acute PE are still very infrequent. In a recently published meta-analysis, only 594 cases of acute massive PE have been treated with catheter directed therapy (CDT), with a success rate of about 86%. [2] A variety of endovascular techniques have been reported in the literature for patients with PE but there are no randomized controlled trials to compare the efficacy amongst them or with systemic thrombolysis, with or without anticoagulation. [3] Although the first patient was a candidate for systemic thrombolysis but refractory arterial hypotension and need for CPR led to the selection of catheter directed therapy as the modality of choice. Other factors were the 2 hour time period required for infusion of full dose of tPA and about 20% risk of major haemorrhage following its infusion.

In a study from a single tertiary referral center in Italy, 33 patients with acute PE who had contraindications to thrombolytic therapy were treated with CDT. It resulted in immediate angiographic improvement with rapid amelioration in functional class and an increase in oxygen saturation. [4] The catheter based fragmentation of the clot leads to mechanical debulking but the breakdown of the clot provides a large exposed area for subsequent thrombolysis. To reduce the incidence of chronic PE and pulmonary hypertension, Food and Drug Administration has approved urokinase and streptokinase. A study conducted at the authors institute in 8 patients of sub-acute massive PE treated with mechanical breakdown and thrombolysis has shown good outcome with use of urokinase. [5] Though the CDT has shown promising results

but is limited by the requirement of great expertise and experience. Increasing level of evidence shows that aggressive management for SPE is beneficial because identification of right heart strain pattern is an independent predictor of 30-day adverse event Thus, its presence must be taken as a warning sign for escalation of treatment. The second case had an absolute contraindication for intravenous thrombolysis as he had undergone recent surgery and suffered from malignant MCA stroke. The dose of locally injected thrombolytic is also much lower thus reducing the risk from bleeding.

The use of endovascular treatment appears to be a promising option for reducing acute and chronic morbidity from PE while avoiding the complications. In urgent clinical settings like the above mentioned cases with neurological disorders where systemic thrombolysis is contraindicated, catheter directed therapy can be considered as a first-line treatment option in lieu of systemic thrombolysis.

References:

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