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CASE REPORT

Inferior Vena Cava Tumour Thrombectomy by Novel Endovascular Approach

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ABSTRAK

Trombus di dalam salur vena kava inferior biasanya memberi gambaran kanser hati tahap terakhir. Sebelum ini, tidak ada sebarang rawatan yang dapat memberikan keputusan yang memberangsangkan. Tetapi dengan kaedah rawatan endovaskular, harapan baru mungkin dapat dikecapi. Kami ingin mempertengahkan satu kes dimana terapi endovaskular menggunakan AngioJet® rheolytic system (Possis Medical, Minneapolis, MN, USA), dapat menunjukkan keputusan yang positif.

Kata kunci: trombektomi, salur vena kava, karsinoma hati, endovaskular

ABSTRACT

The presence of thrombus within the inferior vena cava (IVC) is often a sign of advance hepatocellular carcinoma (HCC). Various treatment methods have been described with variable and inconclusive results. Now, the advancement of endovascular approach offers new possibility as a potential treatment modality. We discuss the removal of tumour thrombus with catheter directed mechanical thrombectomy. IVC tumour secondary HCC was removed by AngioJet® rheolytic system (Possis Medical, Minneapolis, MN, USA) with good result. Further work should be encouraged to explore the prospect of this technique with other treatment modalities.

Keywords: thrombectomy, inferior vena cava, hepatocellular carcinoma, intervention radiology, endovascular

INTRODUCTION

Tumour thrombus arising from advanced hepatocellular carcinoma (HCC) is not an infrequent complication. The usual sites of tumour thrombus are portal vein, hepatic

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vein, bile duct and inferior vena cava. Various treatment modalities have been proposed; including surgical resection, transarterial chemoembolization (TACE) (Fukuda et al. 2002), targeted molecular therapy (Sorafenib), arterial and systemic chemotherapy (Okada 2000), and radiotherapy (conformal radiotherapy (Igaki et al. 2008) and photon beam therapy (Mizumoto et al. 2007)). However, no single method has been proven to be effective in treating this complication (Mizumoto et al. 2007).

The advancement of endovascular approach has now open new possibilities as a treatment option for various pathologies. Catheter directed mechanical thrombectomy is widely used in coronary artery disease, peripheral arterial disease and venous thrombosis (Sharifuddin et al. 2003; Cynamon et al. 2006). To our knowledge, endovascular approach to remove tumour thrombus has not been described previously.

CASE REPORT

A 85-year-old gentleman presented to the surgical out patient clinic with complaint of four months history of weight loss and vague upper abdominal pain. The pain was dull in nature and did not radiate to the back. Hemodynamically stable, his general physical examination revealed yellowish discolouration of sclera and mild cachexia. The abdomen was soft and non-tender with no mass palpable. Liver function tests (LFTs) was noted to be deranged, with bilirubin 79 mg/dL, alanine aminotransferase (ALT) 164 IU/L and alkaline phosphatase (ALP) 1120 IU/L. Ultrasound abdomen showed dilated intrahepatic ducts and common bile duct secondary to external compression from the enlarged porta hepatis lymph nodes. A large, irregular and solid lesion was noted to occupy the left lobe of liver almost entirely. Endoscopic retrograde pancreatography (ERCP) and endobiliary stenting was performed to relieve the biliary obstruction. Hepatitis screen was negative but alpha fetoprotein (AFP) was raised at 3520 ng/mL. A four phase computed tomography (CT) scan of the abdomen confirmed the presence of an ill-defined heterogenous liver lesion measuring 11cm (width) X 7cm (anterior-posterior) X 7.2cm (cauda-cranial), occupying segment II, III and Iva. The lesion demonstrated arterial enhancement and portal as well as delayed phase washout of contrast material. Thrombosis from the left hepatic vein was noted to extend into the inferior vena cava. The liver function test improved post biliary stenting with near normal ALP, ALT and bilirubin levels.

A diagnosis of hepatocellular carcinoma with inferior vena cava thrombosis was made. However, surgical resection of the left lobe of liver was deemed inappropriate, given the extent of the tumour, patient's age and co-morbidities. A multi-disciplinary decision was made to treat this patient by means of transarterial chemoembolisation (TACE) and IVC tumour thrombectomy via endovascular approach.

TACE was performed using a mixture of 50 mg Doxorubicin, Lipiodol and

drug eluding beads. No immediate complication was observed. Almost three days later, he started to experience pain over the eipigastrium and left hypochondrium region. An urgent CT scan of the abdomen revealed multiple air locules within the infarcted liver tumor, suggestive of abscess formation post TACE. The liver abscess was successfully drained percutaneously under ultrasonic guidance and intravenous antibiotics commenced based on culture and sensitivity report. Endovascular thrombectomy of the IVC tumor thrombus was performed 3 days later. We highlight a novel method of IVC thrombectomy using AngioJet® rheolytic thrombectomy system.

AngioJet® rheolytic thrombectomy system consists of an Xpeedior cathether, a pump set, and a drive unit. A larger 6F Expeedior is used to accommodate the larger lumen of an IVC. The pump set and drive unit creates a low-pressure zone at the tip of the cathether. This is done by emitting a jet of high velocity saline solution directed backward from the tip of the device outflow channels. The low-pressure environment causes fragmentation, and clots are aspirated through the effluent lumen (Cynamon et al. 2006). The pump operates at 8500 psi, and the speed of the jet can reach up to 450km/hr producing a vacuum effect of -600mmHg.

The right femoral vein was punctured under aseptic condition and a 5Fr pigtail catheter was passed into the inferior vena cava below the liver level for a diagnostic angiographic run. Using an 8F guider and size 0.038Fr Roadrunner guide wire, a 6Fr AngioJet® catheter was maneuvered to the thrombosed segment of the IVC. Series of thrombosuctions of 5 seconds were performed to a total time of 10 minutes. The patient developed macroscopic haemaglobinuria post procedure, which resolved spontaneously after 36 hours.

RESULTS

A 50% reduction of filling defect was seen immediately post thrombectomy. He was discharged well five days following the endovascular procedure. A repeat CT scan at three months showed no further propagation of IVC tumor thrombus. However, he succumbed to community-acquired pneumonia five months after the initial treatment of advance hepatocellular carcinoma.

DISCUSSION

HCC with IVC tumour thrombosis carry an inferior prognosis. If untreated, mortality is almost certain at 2-3 months from the time of diagnosis (Nagasue et al. 1984). Transarterial chemoembolization (TACE) and intravenous chemotherapy have marginal effect on survival (Bismuth et al. 1992). Surgical resection (hepatectomy with thrombectomy), combined with adjuvant hepatic artery infusion chemotherapy, is the more effective treatment option, although it only improves the survival to 7-8 months (Fukuda et al. 2002). In cases of tumour thrombus extending into the right atrium, there have been reported cases of successful hepatectomy with cava-atrial thrombectomy. However, the long term survival outcomes were

not discussed (Ohwada et al. 2008; Leo et al. 2010). Catheter directed thrombolysis infusion (CDTI) has also been attempted but with no overall success (Stambo et al. 2006).

Recently, photon beam therapy and conformal radiotherapy has shown promising results as the treatment modality for HCC with IVC tumour thrombus. A small case series by Mizumato et al. (2007) showed survival of more than a year upon treatment with photon beam. Treatment with conformal radiotherapy offers reasonable outcome with a median survival of 5.6 months (Igaki et al. 2008).

AngioJet® device is one of the few mechanical thrombectomy devices available in the market. The others include the Oasis (Boston Scientific, Natick, MA, USA), Hydrolyser (Cordis Europe, Roden, Netherlands), and Clot Buster Amplatz Thrombectomy Device (ATD, Microvena, White Bear Lake, MN, USA). Amplatz thrombectomy device has been reported to remove thrombus up to 73% at caval level (Delomez et al. 2001). Hydrolyser device has been successfully used to recanalise thrombosed ileofemoral and IVC and removing thrombosis around IVC filters (Poon et al. 2002). However, to the best of our knowledge, removal of IVC tumour thrombus has never been described previously.

In this patient, significant amount of thrombus was removed, although complete thrombectomy was not achieved. Total clearance of thrombus is very difficult in large vessels like the IVC, although Delomez et al. (2001) documented angiographic evidence of 100% removal in their case series.

Endovascular thrmboectomy aside, localised thrombolysis is widely used as adjuvant therapy to improve overall venous patency (Sharifuddin et al. 2003). Localised Urokinase infusion has been showed to be effective in lysing benign IVC thrombosis (Angle et al. 1998). However, Stambo et al. (2006) to lyse tumour thrombus using Tenectaplase for 24 hours did not show any significant improvement.

The consequences of IVC tumour thrombus include IVC obstruction syndrome. The symptoms of IVC obstruction include progressive ascites, scrotal and lower body oedema. These symptoms are devastating to a patient with end-stage cancer. The use of rheolytic thrombectomy has the potential to provide symptomatic relief to these patients. However, re-thrombosis of the IVC is common due to phlebitis and residual thrombus (Gu et al. 1997). Anticoagulant therapy would maintain patency in normal circumstances, but its role in the prevention of tumour re-thrombosis is not known.

CONCLUSION

Our experience demonstrates the feasibility of rheolytic thrombectomy for the removal of IVC tumor thrombus. Mechanical thrombectomy could reduce tumour load and established patency of the IVC. The effect on the overall mortality rate is yet to be explored. There is scope for further fine tuning of the procedure to achieve the desired effect.

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