CASE REPORT

Reperfusion Injury Tourniquet Syndrome Caused by Acute Aortic Occlusion due to Embolism Following Pneumonectomy

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Introduction

Thromboembolism of the arterial system is due to cardiac disease in 90% of cases.1 It has been frequently reported with atrial myxoma and is estimated to occur in as many as 45% of these patients.2 Massive malignant tumour embolism in arteries is rare and infrequently reported. A comprehensive review of the literature has yielded 60 documented cases (excluding atrial myxomas); in most of the cases the arterial tumour embolism was due to primary lung cancer.3

The occurrence of arterial embolism caused by tumour fragments is an unusual complication of advanced lung cancer. Systemic arterial tumour embolisation is a rare complication after pulmonary resection; it is more frequently associated with pneumectomy than with lesser pulmonary resections.4

We present a case of reperfusion injury caused by acute aortic occlusion due to tumour embolism following pneumonectomy of the right lung for squamous cell carcinoma.

Case Report

A 58-year-old woman was found to have a right upper lobe mass on routine chest X-ray. Contrast enhanced computed tomography of the chest showed a 6 cm mass in the right upper lobe with no aorticopulmonary lymphadenopathy. Flexible fiberoptic bronchoscopy demonstrated tumourous obstruction of the ventral segment of the right upper lobe. Histopathological examination of endotracheal biopsies revealed squamous cell carcinoma. Preoperative evaluation including laboratory studies and cardiac evaluation showed no contraindication to major pulmonary resection. At thoracotomy, the pleura was adherent in the entire area of the right upper lobe. No tumour was noted within the inferior pulmonary vein. A right pneumonectomy was performed and the patient was transferred to the intensive care unit. Histopathological examination revealed a pT2pN1pM0, G3 tumour.

The early postoperative course was complicated by development of progressive oliguria. Twenty-four hours postoperatively the patient complained of pain in both lower extremities, which were cool, pulseless, and partially paralysed. A Duplex scan and arteriography demonstrated complete occlusion of the proximal aorta below the origin of the superior mesenteric artery (Fig. 1). Immediate direct embolectomy through an aortotomy using transperitoneal approach was performed. The intraoperative findings disclosed a 2 × 1 cm embolus lodged between the superior mesenteric artery and the renal arteries. The embolus was confirmed pathologically to be of the same cell type as the primary pulmonary tumour. Following embolectomy the peripheral pulses returned to normal.

Recovery was complicated by the development of a reperfusion injury associated with hypotonia, tachycardia, hyperkalaemia, metabolic acidosis and myoglobinuria. The subsequent renal insufficiency progressed to acute renal failure necessitating seven courses of temporary haemodialysis. One day after successful embolectomy the patient developed tense
swelling in both lower extremities. Diminished sensation in both legs followed by excruciating pain produced by passive stretch of the muscles in association with peroneal weakness on both sides led to the diagnosis of compartment syndrome. Emergency bilateral fasciotomy was performed. Eight weeks after pneumonectomy the patient was discharged from the intensive care unit. Haemodynamic and renal parameters at this time were normal. Two weeks later the patient was discharged from the hospital. Eight months later the peroneal weakness has improved and there is no evidence of metastatic disease.

Discussion

Malignant arterial tumour emboli large enough to cause ischaemia are a rare, and often fatal, complication of neoplastic disease. The majority of cases of large arterial tumour emboli are associated with either primary or secondary pulmonary malignancies and mostly occur perioperatively or immediately postoperatively. The principle of primary vein ligation in tumour surgery is widely applied and primary ligation or clamping of the pulmonary veins has been strongly recommended to reduce the risk of embolic consequences in pulmonary surgery.

Primary tumours of the aorta and the peripheral arteries may also embolise distally. Angiosarcomas and intimal sarcomas are exceedingly rare but are prone to dislodge and embolise at any time. The frequent tendency of lung tumours to invade the pulmonary veins is the probable reason why these tumours are the commonest cause of arterial tumour embolism. There is no evidence from previous reports that tumour embolism is any more likely to occur in patients with large tumours. The two most common sites of lodgement are the lower extremities (41.7%) and cerebral vessels (27.8%).

The treatment of arterial tumour embolism necessitates immediate embolectomy plus heparinisation to prevent propagation of distal thrombus. The first reported case of successful tumour embolectomy was by Groth, whose patient suffered an arterial tumour embolus whilst undergoing resection of a pulmonary metastasis originating from a tibial sarcoma. For patients with massive tumour emboli, the embolic event carries substantial morbidity and mortality. For those patients who survive embolectomy, prognosis is most closely related to the TNM staging of the primary tumour. All of these patients tend to die of metastatic disease and without symptoms related to arterial tumour emboli. The longest recorded survival after tumour embolectomy was 20 months. The overall success rate (defined as successful embolectomy and survival of the end organ affected by the tumour embolus) is reported to be 84%. Thus
treatment of accessible arterial tumour embolism should always be attempted.

Major tumour embolism in the arterial system is rare, but the potential consequences can be devastating. Embolectomy should always be attempted, as the success rate is very good despite the poor overall prognosis of the underlying disease.

References

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