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Inferior vena caval filters following deep vein thrombosis in patients with ruptured intracranial aneurysm

對腦動脈瘤破裂患者患縱深血栓症後的下靜脈腔靜脈過濾

Anticoagulant therapy is highly effective and prevents death in more than 95% of patients who have suffered pulmonary embolism following deep vein thrombosis. Inferior vena caval filters provide an alternative to full anticoagulation in those patients at highest risk of catastrophic haemorrhagic complications. We report on two patients who developed deep vein thrombosis following ruptured unsecured intracranial aneurysms. Inferior vena caval filters were inserted prior to aneurysm clipping, as a prophylactic measure to prevent pulmonary embolism while awaiting surgery. The patients did not receive anticoagulant therapy following successful clipping of the aneurysm. Both patients had clinical resolution of the lower limb swelling and no radiological evidence of propagation of the thrombus. During 18 months of follow-up there were no complications and no evidence of post-thrombotic syndrome.

抗凝血劑治療是高效治療方法，可以防止95%以上的深度靜脈血栓症後肺栓塞患者死亡。下腔靜脈過濾器為那些突發性出血併發症高危患者提供了全抗凝血劑治療的替代方法。我們報告了兩名腦動脈瘤破裂後併發深度靜脈血栓症的病例。下腔靜脈過濾器在動脈瘤切除前插入，作為預防措施防止在等待外科手術時出現肺部栓塞。患者在成功切除動脈瘤後沒有進行抗凝血劑治療。這兩位患者都接受了下肢腫脹的臨床治療，放射性檢查沒有發現血栓擴散。在18個月跟進期間並沒有發現併發症，也沒有血栓形成後綜合症的跡象。

Introduction

Patients suffering from aneurysmal subarachnoid haemorrhage are classified as having a moderate risk (10%-40%) for developing deep vein thrombosis.[1] Mechanical techniques, such as graduated compression stockings, electrical stimulation of the calf muscles, intermittent external pneumatic calf compression, and early ambulation offer adequate prophylaxis for most of these patients.[2-5] Despite these measures, deep vein thrombosis and pulmonary embolism may still occur. Anticoagulant therapy is highly effective and prevents death in more than 95% of patients who have suffered a pulmonary embolism following deep vein thrombosis. Inferior vena caval filters provide an alternative to full anticoagulation in those patients at highest risk of catastrophic haemorrhagic complications as a result of anticoagulation therapy. We report on two patients with deep vein thrombosis following ruptured unsecured intracranial aneurysm who underwent inferior vena caval filter placement.

Case reports

Case 1

A 62-year-old woman presented with sudden onset of headache, confusion, and left-sided weakness. On clinical examination, she was disorientated and had a left hemiplegia. Computed tomography of the brain showed a haematoma in the right temporal lobe with intraventricular extension into the right lateral ventricle and a small amount of blood in the right Sylvian fissure. A cerebral angiogram showed a suspicious aneurysm near the junction between the right

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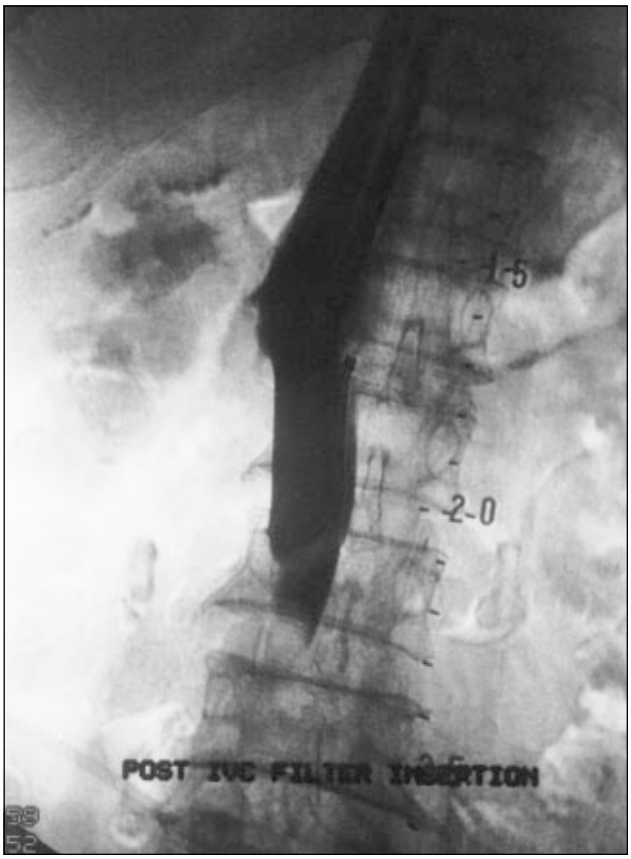

Fig 1. Inferior vena cavogram (jugular route) shows occlusive thrombus extending from the left common iliac vein to the inferior vena cava. Following placement the inferior vena caval filter can be seen in situ

posterior communicating and right posterior cerebral arteries. Delayed repeat cerebral angiogram and aneurysm intervention were scheduled approximately 2 weeks after initial presentation. However, the patient was noted to have left lower limb swelling and Doppler ultrasound revealed a venous thrombus extending from the left external iliac vein to the lower inferior vena cava. Using the right jugular approach, a permanent inferior vena caval filter (Boston Scientific Inc., Greenfield, US) was placed inside the inferior vena cava above the thrombus, just inferior to the origin of the right gonadal vein and the renal veins (Fig 1).

Repeat cerebral angiography and clipping of the aneurysm were subsequently performed. The postoperative course was unremarkable and the patient was transferred to a rehabilitation centre 8 days after surgery.

Anticoagulation therapy was not given, in view of the clinical resolution of the left lower limb swelling and absence of propagation of the thrombus on repeat Doppler ultrasound. The left lower limb swelling gradually subsided. On follow-up Doppler ultrasound, the thrombus showed recanalisation with no progression. The patient was discharged home 6 months after the subarachnoid haemorrhage, with normal cognitive function and a dense left hemiplegia. No evidence of complications from the inferior vena caval filter has been noted in the 18 months since its insertion.

Case 2

A 60-year-old hypertensive woman presented to a district general hospital with sudden onset of headache followed by loss of consciousness (Glasgow Coma Score, 8). The patient was intubated. Computed tomography of the brain showed a Fisher Grade III subarachnoid haemorrhage with associated hydrocephalus. The patient was managed in the intensive care unit with intracranial pressure monitoring. Digital subtraction angiography at this time demonstrated a prominent basilar artery bifurcation, suggestive of an underlying aneurysm. Delayed repeat cerebral angiography and aneurysm intervention were planned. On day 14, the patient was noted to have left lower limb swelling and Doppler ultrasound showed complete thrombotic occlusion from the left popliteal vein as far as the left common iliac vein.

In view of the unsecured aneurysm, anticoagulation was contraindicated, and inferior vena caval filter insertion was selected as treatment. Through a right femoral venous approach, the level of the renal veins was located by inferior vena cavogram. A permanent inferior vena caval filter (LGM 30D/U, B Braun, Poitou, France) was placed just inferior to the level of the renal veins (Fig 2). The procedure angiography confirmed a small basilar tip aneurysm suitable for clipping and subsequently, this was completed via a right pterional transsylvian approach. The left lower limb swelling gradually resolved and follow-up Doppler ultrasound showed no progression of the thrombosis. Anticoagulation was not given. Following

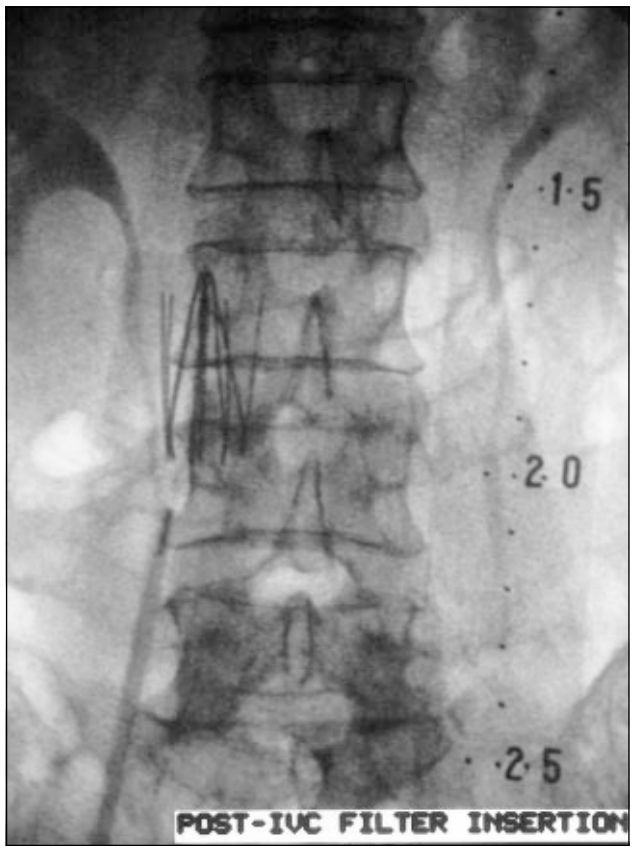

Fig 2. Inferior vena cavogram shows inferior vena caval filter inserted through the right femoral route

rehabilitation, the patient became independent in daily activities. There have been no complications from the inferior vena caval filter in the 21 months since its insertion.

Discussion

Currently, one of the absolute contraindications for full anticoagulation as part of treatment for deep vein thrombosis is the presence of an unsecured intracranial aneurysm following a subarachnoid haemorrhage. Patients with unsecured intracranial aneurysms with deep vein thrombosis during the acute phase after subarachnoid haemorrhage can be managed by placement of an inferior vena caval filter to prevent pulmonary embolism.

Inferior vena caval filters can be inserted using a transjugular or transfemoral venous approach. The filter acts by trapping emboli while maintaining caval blood flow and patency. Possible complications, such as migration of the filter and inferior vena caval blockade, should always be borne in mind.[6]

It has been suggested that having placed an inferior vena caval filter in situ, anticoagulation should be started following securing of the aneurysm. The theoretical rationale is firstly, that anticoagulation therapy can limit the propagation of deep vein thrombosis and secondly, that it can help to maintain patency of the inferior vena cava by decreasing the emboli load trapped within the filter. However, experience has shown that anticoagulation does not influence the patency rate of the inferior vena cava or the pulmonary emboli rate.[7,8] In addition, the timing of anticoagulation therapy after intracranial surgery remains controversial.[9-12] There is some evidence to indicate the safety of anticoagulation after postoperative week 1.[1] Based on a retrospective series, Kawamata et al[13] concluded that it is safe to initiate anticoagulation therapy after a postoperative interval of 3 days. Clot stabilisation, with brain tissue gliosis peaking at day 3-4 is believed to play an important role in preventing postcraniotomy haemorrhage.[10]

In view of the controversy in the literature, clinical improvement, and failure to demonstrate radiological progression, anticoagulation therapy was not utilised in the patients discussed. The patients were noted to be symptom-free 18 months after inferior vena caval filter insertion. An alternative management approach could have included use of a retrievable inferior venal caval filter with delayed anticoagulation. However, the increase in risk of major bleeding (following craniotomy and anticoagulation) and complications related to filter retrieval would probably negate the decrease in recurrent deep vein thrombosis risk and make this approach unattractive.[14,15]

Conclusion

To the best of our knowledge, these are the first two case reports describing the use of mechanical prophylaxis without anticoagulation in patients with aneurysmal subarachnoid haemorrhage complicated by deep vein thrombosis. Neither of the patients developed any short-term (eg inferior vena caval block, pulmonary embolism) or long-term complications (eg post-thrombotic syndrome). We suggest that inferior vena caval filter insertion, without subsequent systemic anticoagulation, is a feasible treatment option for the prevention of pulmonary embolism in selected patients with ruptured intracranial aneurysm.

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