An open surgical approach to facilitate endovascular thrombectomy for acute stroke: how vascular surgery can play a role

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Endovascular thrombectomy (EVT) is currently regarded as the gold standard of treatment in acute stroke. In this report, we describe an open surgical approach to treat an extracranial clot occlusion, which allowed for endovascular access to manage the intracranial occlusion.

An 82-year-old woman presented with sudden onset left sided hemiplegia, with a NIHSS score of 15. Multi-modal CT demonstrated a right MCA M1 occlusion (as shown in Figure 1) with a right MCA territory infarct. Concordantly, CT angiogram showed an ipsilateral long, incompletely occlusive thrombus in the right internal carotid artery (ICA) as shown in Figure 1.

The patient was not administered any thrombolytic medication and was referred urgently for EVT. However, during the procedure, an unfavourable anatomy made it impossible to pass the catheter into the right common carotid artery. Endovascular access was deemed too difficult considering the patient also has a long segment of non-occlusive thrombus in the internal carotid artery. A decision was made to perform an open surgical trans-carotid approach to allow for endovascular thrombectomy to be carried out. The carotid artery was accessed via an antejugular approach. Arteriotomy was performed over the carotid bulb with good back-bleeding, allowing for retrieval of moderate amount of fresh thrombus. As there was good pulsatile back-bleeding post retrieval of thrombus, a Fogarty catheter was not required during the procedure. Prior to arterial closure, a completion angiogram was performed which demonstrated resolution of the M1 to M2 occlusion (as shown in Figure 2). Arteriotomy was then closed primarily with prolene sutures.

The patient made a moderate neurological

Figure 1: CT angiogram showing right MCA M1 to M2 occlusion on the axial image (left) and right ICA incomplete occlusion on coronal image (right); red arrow.
recovery. Follow-up CT on day one post intervention showed a right basal ganglia haematoma consistent with haemorrhagic transformation. She developed atrial fibrillation post intervention—this was managed with beta-blockers, and was commenced on Dabigatran two weeks post her initial presentation. She was then transferred for further rehabilitation before returning home. Her modified Rankin Scale (mRS) score at 90 days was 1.

Discussion

Tandem lesions make up about 20% of acute stroke presentations. Currently, there exists a state of clinical equipoise into the best management options of tandem lesions, in particular lesions involving the internal carotid artery (ICA) and the middle cerebral artery (MCA). This involved either treating the extracranial lesion or the intracranial lesion first followed by the other, with most published studies demonstrating quite similar outcomes with the only notable difference in timing to cerebral reperfusion. Nevertheless, all of these methods involve an endovascular approach.

Occasionally, challenges happen that would prohibit a total endovascular approach to EVT in acute stroke. These include an unfavourable aortic arch anatomy, tortuous carotid artery, aorto-occlusive or peripheral vascular disease. This would mean a shift towards using an unorthodox approach, to overcome these obstacles, would be required. To our knowledge, this case is the first to report on the use of an open surgical approach to facilitate EVT in acute stroke. Most published cases report on the application of an open surgical approach in the treatment of extracranial lesion following EVT, rather than a direct surgical cut down in the beginning. Carotid endarterectomy itself, if performed acutely to treat extracranial lesions in the context of tandem lesions, have been shown to yield a good outcome with no post-operative intracranial haemorrhage and no 30-day mortality.

With the advancement of medical technology, direct carotid puncture is a feasible, minimally invasive approach compared to an open surgical cutdown. However, current endovascular armamentarium remains a limiting factor as they are not designed specifically for a trans-carotid approach. Furthermore, there are no well-designed vascular closure device for this approach. There have been published reports on the success of using current available percutaneous closure devices; however, these are done off-label.

The complexity in the management of tandem lesions in acute stroke warrants a multidisciplinary approach, which could be an area where Vascular surgery could play a role. Further research is required in ascertaining the best approach for these patients.
COMPETING INTERESTS
Nil.

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REFERENCES