TECHNICAL NOTE

Brachial to Carotid Shunt for Carotid Endarterectomy

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Introduction

Although several randomised trials had established the role of carotid endarterectomy in the prevention of stroke, reports of operative risk of 2 to 8% from these studies demonstrate the need for further investigation into the cause of perioperative stroke.1–3 The use of a shunt during CE has been an established practice to protect the patients from ischemic events.4,5 However, its use remains controversial because of embolisation or intimal damage. Considering the shunt placement in the presence of common carotid artery disease as a potential cause of distal embolisation, we reported a review of all patients with internal carotid artery stenosis >70% associated with a common carotid artery disease in whom a carotid endarterectomy was performed using a temporary brachial to internal carotid artery shunt (external shunt, ES) (Fig. 1).

Material and Methods

Thirty-two consecutive patients undergoing evaluation for CE were enrolled. All patients had significant internal carotid artery stenosis (>70%) as defined by established duplex scan criteria. The average age was 63 years old (54–83 years), and 28 were male. Twenty patients were asymptomatic. One patient had a contralateral carotid occlusion and another patient was treated by means of contralateral CE. All procedures were performed in the operating room under general anaesthesia. Transcranial Doppler ultrasound was used in 24 patients (75%) for monitoring middle cerebral artery velocity (MCAV).

Technique

After selective and sequential clamping, as arteriotomy was performed, the distal end of the Javid shunt (Bard, Tempe, AZ, U.S.A.) was inserted into the ICA. A 6Fr brachial introducer (Pinnacle Introducer Sheath, Meditech, Boston Scientific Corporation, Watertown, MA, U.S.A.) was attached to the proximal end of the Javid shunt with a plastic tube (BT-26 catheter, Diavamedic, Buenos Aires Argentina) to restore ICA flow.

The indications for the ES placement were severe CCAP disease (Fig. 2).

The endarterectomy technique has been described previously. All patients received a patch angioplasty.

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Fig. 1. External shunt scheme.
Brachial to Carotid Shunt for CE

Results

None of the patients presented any neurological deficit or death in the perioperative period. Neither did they present with complications related to the use of the shunt. No significant drop in MCAV after ES placement was registered. TCD monitoring revealed no cerebral emboli during shunt placement.

Discussion

When we examined the mechanisms of our perioperative complications, we found one case out of fourteen in whom the embolism associated with shunt placement was the cause of the perioperative stroke.

The placement of the shunt through a severely diseased CCA can lead to embolisation. Kadwa demonstrated a 14.7% incidence of significant aortic arch branch disease in patients presenting for treatment of carotid bifurcation stenosis. In the presence of a long proximal plaque, we have relied on long arteriotomy, deep endarterectomy, plaque fixation, and patch closure, all of them made after ES placement.

High grade stenosis may be present in the ostium of the brachio-cephalic or common carotid artery. Although endovascular treatment is now an option, many worried about the risk of embolisation. We advocate treating the proximal lesion by balloon angioplasty and stenting followed by conventional carotid bifurcation endarterectomy, minimising the risk of distal embolization by a proximal clamping and maintaining distal carotid artery and cerebral perfusion by ES placement.

In conclusion, ES from the brachial to the internal carotid artery diminishes the embolic risk due to shunt placement or proximal common carotid artery angioplasty.

References


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