

Indocyanine green videoangiography for bypass surgery

It has been established as a noninvasive technique to gauge the patency of a bypass graft; however, intraoperative graft patency may not always correlate with graft flow. Altered flow through the bypass graft may directly cause delayed graft occlusion.

Januszewski et al. report on 3 types of flow that were observed through cerebral revascularization procedures in 48 bypass procedures.

After anastomosis, bypass patency was assessed first using a noninvasive technique and then with ICG videoangiography, and flow through the graft was characterized. Patients who received a vein or radial artery graft were also evaluated with intraoperative angiography.

Thirty-three patients eligible for analysis were retrospectively analyzed. The patients had undergone extracranial-intracranial (EC-IC) or IC-IC bypass for ischemic stroke (13 patients), moyamoya disease (10 patients), and complex aneurysms (10 patients; 6 giant or large aneurysms, 2 carotid blister-like aneurysms, and 2 dissecting posterior inferior cerebellar artery [PICA] aneurysms). Thirty-six bypasses were performed including 26 superficial temporal artery (STA)-middle cerebral artery (MCA) bypasses (2 bilateral and 1 double-barrel), 6 EC-IC vein grafts, 1 EC-IC radial artery graft, 1 PICA-PICA bypass, 1 MCA-posterior cerebral artery bypass, and 1 occipital artery-PICA bypass. Robust antegrade flow (Type I) was noted in 31 grafts (86%). Delayed but patent graft enhancement and antegrade flow (Type II) was observed in 4 cases (11%); 1 of these cases with an EC-IC vein graft degraded gradually to very delayed flow with no continuity to the bypass site (Type III). Additionally, 1 STA-MCA bypass graft revealed no convincing flow (Type III). The 5 patients with Type II or III grafts were evaluated with a flow probe and reexploration of the bypass site, and in all cases the reason the graft became occluded was believed to be recipient-vessel competitive flow. In no case was there evidence of stenosis or a technical issue at the site of the anastomosis. Three patients with Type II and the 1 patient with Type III flow (11% of procedures) did not have a patent bypass on postoperative imaging.

The type of flow observed through the graft has a direct relationship with postoperative imaging findings. Despite the possibility of competitive flow, Type III and some Type II flows through the graft indicate the need for graft evaluation and anastomosis exploration ¹⁾.

Case reports

Posterior circulation ischemia often presents with dizziness, ataxia, visual disturbances, or motor-sensory deficits. The vertebral artery stenosis most frequently involves the V1 segment proximal to the foraminal segment. This patient demonstrated critical stenosis of the left V1 segment of the vertebral artery related to atherosclerotic disease. A left cervical dissection was performed, and the cervical transverse foramen was opened to permit exposure of the vertebral artery in the V2 segment. The vertebral artery was proximally occluded and transected. An endarterectomy was performed, and an end-to-end anastomosis of the facial branch of the external carotid artery to the distal segment of the transected vertebral artery was completed. Indocyanine green angiography was used to confirm patency of the anastomosis. The patient gave informed consent for surgery and video recording. Institutional review board approval was deemed unnecessary ²⁾.

1)

Januszewski J, Beecher JS, Chalif DJ, Dehdashti AR. Flow-based evaluation of cerebral revascularization using near-infrared indocyanine green videoangiography. *Neurosurg Focus*. 2014 Feb;36(2):E14. doi: 10.3171/2013.12.FOCUS13473. PubMed PMID: 24484252.

2)

Hendricks BK, Spetzler RF. Cervical Vertebral Artery to Facial Branch External Carotid Artery Bypass: 2-Dimensional Operative Video. *Oper Neurosurg (Hagerstown)*. 2020 Mar 6. pii: opaa028. doi: 10.1093/ons/opaa028. [Epub ahead of print] PubMed PMID: 32147714.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

https://neurosurgerywiki.com/wiki/doku.php?id=indocyanine_green_videoangiography_for_bypass_surgery

Last update: **2024/06/07 02:59**

