

Carotid endarterectomy: What difference does a clinical protocol make?



Tanghua Chen, RN, BN (Hons), Grad Cert ICU, MPH and John A. Crozier, MBBS, FRACS, FRCST, DDU (Vasc)

Background: The initial eight hours after carotid endarterectomy (CEA) are crucial to patient outcome as many potential complications can occur during this period. Hypotension is one of the most common issues observed after patients have returned to the surgical ward. Postoperative management of patients undergoing CEA varies between facilities, with reported direct intensive care unit or surgical high dependence unit admission. Patients that underwent a CEA procedure at the study hospital were monitored in the Recovery Unit for a minimum of four hours before being transferred to the surgical ward. Episodes of hypotension, on return to the surgical ward, were one of the main issues identified. This observation resulted in revision of the CEA management policy with collaboration from all specialties involved in the care of patients undergoing a CEA. The aim of this study was to compare whether there was any difference in short-term clinical outcomes between preupdate and postupdate of the carotid management policy in a tertiary referral hospital in New South Wales.

Methodology: Retrospective review of health care records was undertaken for the following two time intervals: pre-policy change from July 2008 to June 2009; postpolicy change from June 2011 to May 2012. Hypotension was defined as a systolic blood pressure less than 90 mm Hg. State SE 12.1 was used for data analysis.

Results: After assessing for potential confounding factors—such as postoperative heart rate, risk factors, gender, and age—patients from the postpolicy change group were less likely to receive vasoactive medications to manage blood pressure deviation (OR, 0.33; 95% CI, 0.12–0.91; $P = 0.026$), the odds of receiving vasoactive medications was 0.33 times lower than that of the pre-policy change group patients, and is 95% confident that the true association lies between 0.12 and 0.91 in the underlying population. Over 90% of intensive care unit admission was avoided in patients from the postpolicy change group with estimated cost saving of \$807 Australian dollars per patient.

Conclusions: The study hospital postoperative carotid surgery management policy has driven practice change with an extended Recovery Unit observation. This is a cost effective and safer management method. The Clinical Nurse Consultant was essential for clinical policy development, implementation, and evaluation. (J Vasc Nurs 2016;34:100-105)

Carotid endarterectomy (CEA) is one of the most frequently performed vascular surgical procedures. It is performed under general anesthesia at the study facility. A key aim of postoperative CEA management is the appropriate utilisation of health care resources such as the high-in-demand and expensive intensive care unit (ICU) bed versus a surgical bed balanced against optimal patient outcome. To meet the “Six Dimensions of Quality of Health Care” as outlined by the Department of Health New South Wales (NSW),¹ our hospital has developed a CEA policy for postoperative management. One of the unique features of this policy is direct patient transfer to the surgical ward postoperatively after an extended recovery observation period provided a number of criteria are met.

In the Recovery Unit, continuous electrocardiography (ECG), pulse oximetry, heart rate, and intra-arterial blood pres-

sure observations are documented. Monitoring, assessment, and documentation of airway patency, vital signs, neurologic status, and surgical site for hematoma and drainage every 15 minutes intervals, recovery nursing staff are to report to the anaesthetist if any of the previously mentioned observations are abnormal (outside the predetermined range by the surgeon). Treatment options for hypotension are determined by the medical officer who reviews the patient. It was identified that premature ward admission postoperative was one of the main issues after its implementation.

Premature discharge from the recovery unit postoperatively resulted in several patients requiring Medical Emergency Team (MET) call for episodes of hypotension shortly after their arrival on the surgical ward.

The Clinical Nurse Consultant (CNC) conducted a snap retrospective review of medical records for 12 months periods to identify deficiency in the protocol. It was found that the ICU admission criteria were not clearly defined in the protocol. This resulted in difficulty of interpretation and potential for protocol violation. The audit results were sent together with the revised postoperative CEA management policy to the relevant medical Head of Departments and senior nursing team members by the CNC. It was suggested that some of the terms in the previous policy had not been clearly defined and required revision, for example, management of persistent hypertension or hypotension.

The existing CEA management policy was updated with a clearer defined duration within recovery if the patient received

From the Department of Vascular Surgery, Liverpool Hospital, Sydney, Australia.

Corresponding author: Tanghua Chen, RN, BN (Hons), Grad Cert ICU, MPH, Liverpool Hospital, Vascular Surgery, Elizabeth Street, Liverpool, Sydney 2170, Australia (E-mail: tanghua.chen@sswhs.nsw.gov.au).

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TABLE 1

CRITERIA FOR ADMISSION INTO ICU (PREUPDATED POLICY)

- Therapy is required for persistent hypertension or hypotension.
- Treatment is required for severe cardiac and other organ failure.
- New neurologic signs or symptoms develop that require airway management, and there is no plan for return to the operating theater.
- Bleeding or hematoma from surgical wound and there is no plan for return to the operating theater.

OR

- Complications directly related to the anesthetic given for the operation.
- Critical premonitory conditions that were identified at the anesthetic clinic and referred before surgery to the ICU outside Senior Registrar.

ICU = intensive care unit.

TABLE 2

CRITERIA FOR ADMISSION INTO ICU (POSTUPDATED POLICY)

- Therapy is required for persistent hypertension or hypotension.
- Treatment is required for severe cardiac and other organ failure.
- New neurologic signs or symptoms including those that require reintubation.
- Bleeding or hematoma from surgical wound that does not require immediate surgical intervention (however, this needs to be reviewed by the surgeon and/or vascular registrar as most bleeding will require surgical intervention).

OR

- Complications directly related to the anesthetic given for the operation.
- Critical premonitory conditions that were identified at the preanesthetic clinic and referred before surgery to the ICU outside Senior Registrar or Staff Specialist; the case should have been discussed for a potential ICU/HDU admission.
- Repeated intervention in recovery for persistent hypotension or hypertension is an indication for ICU admission after medical handover.

ICU = intensive care unit; HDU = high dependence unit.

intervention for management of persistent hypertension or hypotension and clearer defined criteria for ICU admission. Summary of the ICU admission criteria for the existing CEA policy listed in Table 1 and Table 2 for the postupdated policy.

The purpose of this study is to determine the difference in short-term clinical outcomes between preprotocol and postprotocol revision by comparing the number of MET calls, ICU admission rate, and cost associated with its management.

LITERATURE REVIEW

The initial eight hours postoperative CEA are crucial to the patient's outcome as many of the potential complications can occur during this period.^{2,3} Hypotension is one of the most common issues observed after the patient had returned to the surgical ward; Angel et al⁴ (2004) found 15% of patients had episodes of hypotension in their ward cohort, 12% of patients who developed postoperative hypotension requiring administration of intravenous (IV) vasoactive medication for treatment.⁵⁻⁷ Postoperative management of patients who underwent CEA varies between facilities with either reported direct ICU or surgical high dependence unit (HDU) admission^{4,6} or managed in a vascular surgical ward. In a vascular surgical ward, the initial postoperative care is managed by a senior vascular registered nurse with 1:2 nurse-to-patient ratio for approximately eight hours after an extended period of observation in the Recovery Unit.⁷ An Australian survey study⁸ showed that 34% of the vascular surgeons have sent their patients to ICU, 33% to HDU, while 23% returned their patients to the general surgical ward. Only 9% of the surgeons preferred prolonged recovery observation. O'Brien and Ricotta⁹ conducted a retrospective study by randomly sampling 73 medical records of patients who underwent CEA. The authors suggest that an extended observation period in the Recovery Unit or a step down unit

will eliminate 82% of ICU admission. This is because a prolonged recovery stay will enable most patients to be weaned off infusion of vasoactive medications for managing liable blood pressure that they were admitted to ICU for. This would consequently optimize resources usage and match the care delivery to the patient's need without compromising patient outcomes.

Katz and Kohl¹⁰ developed a clinical protocol with 6 hours recovery observation time for patients who underwent nonaortic arterial surgery including CEA; the authors claimed that it was cost effective without compromising clinical outcomes. Other studies^{6,11} also provide evidence that routine ICU admission after CEA is not warranted for most patients; however, hemodynamic instability has been associated with an increased incidence of complications in patients after carotid artery surgery,¹²⁻¹⁵ the at-risk patients should therefore be actively managed to prevent the increased morbidity and mortality associated with postprocedural hemodynamic variations.^{12,13} It is the responsibility of clinicians to ensure that the clinical interventions provided are cost effective with good outcomes. One of the strategies in achieving this goal is the development of protocol-based care to facilitate standardization of practices based on the current best available evidence.¹⁶⁻¹⁸ As a mechanism of standardization, terms such as guidelines, care maps, clinical pathways, critical pathways, or algorithms have all been referred to as protocol-based care.^{17,18} Policy and

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