A Clinical Guideline for Blood Pressure Management Post Carotid Endarterectomy (CEA)

### A Clinical Guideline

<table>
<thead>
<tr>
<th>For use in:</th>
<th>In all Clinical Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>By:</td>
<td>Anaesthetists, Theatre Recovery Staff, Critical Care staff, Ward Nurses and Doctors</td>
</tr>
<tr>
<td>For:</td>
<td>Blood pressure management of patients following Carotid Endarterectomy</td>
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<tr>
<td>Names and job titles of document authors:</td>
<td>Dr Santhosh Kumar, Clinical fellow in Vascular Anaesthesia. Dr David Nunn, Consultant Vascular Anaesthetist.</td>
</tr>
<tr>
<td>Name of document author's Line Manager:</td>
<td>Dr David Spackman</td>
</tr>
<tr>
<td>Job title of author's Line Manager:</td>
<td>Clinical Director</td>
</tr>
<tr>
<td>Supported by:</td>
<td>Dr L Barker, Consultant Anaesthetist</td>
</tr>
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</table>

This guideline has been approved by the Trust's Clinical Guidelines Assessment Panel as an aid to the diagnosis and management of relevant patients and clinical circumstances. Not every patient or situation fits neatly into a standard guideline scenario and the guideline must be interpreted and applied in practice in the light of prevailing clinical circumstances, the diagnostic and treatment options available and the professional judgement, knowledge and expertise of relevant clinicians. It is advised that the rationale for any departure from
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relevant guidance should be documented in the patient's case notes.
The Trust's guidelines are made publicly available as part of the collective endeavour to continuously improve the quality of healthcare through sharing medical experience and knowledge. The Trust accepts no responsibility for any misunderstanding or misapplication of this document.

Quick Reference Guide for Hypertension

For use in theatre recovery or critical care complex (CCC)

Systolic blood pressure > 160 mmHg
(Aim target blood pressures < 160 mmHg or 20% around baseline value.)
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Management of hypertension for use on the WARD:

Consider seeking a medical opinion
Quick Reference Guide for Hypotension

For use in Recovery / CCC
A Clinical Guideline for Blood Pressure Management Post Carotid Endarterectomy (CEA)

Objectives

Objectives of Optimal Blood Pressure Management:

Rationale

Carotid endarterectomy (CEA) is a preventative procedure performed to remove the atherosclerotic plaque from within the internal carotid artery in the neck, following a TIA (transient ischaemic attack) or stroke, to prevent similar incidents in the future. This procedure is normally done under a GA (general anaesthetic), although a local anaesthetic technique with a cervical plexus block may be used.

These are high risk operations as these patients tend to have high blood pressures (altered autoregulation of cerebral flow) along with other co-morbidities.

In these patients, the baro-receptors which normally respond to changes in blood pressures do not function very effectively due to stroke and the nature of surgery. Optimal blood pressure control is the key to reducing mortality and morbidity during and after surgery. Close monitoring of blood pressure via an indwelling intra-arterial cannula is used for at least the first 4-6 hrs following surgery.

About 66% of patients develop severe postoperative hypertension of which 40% require drug treatment. Severe pre-operative and post-operative high blood pressures predispose to cardio-vascular and neurological complications.
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1. Myocardial infarction.

The incidence of peri-operative myocardial infarction (MI) is 0-4% \(^7,8\) and coronary artery disease is the leading cause of both early and late mortality.

2. Stroke.

Any new neurological symptoms and signs that occur post-operatively require emergency surgical consultation and intervention. Incidence of a major stroke following these procedures is 2-5% \(^9,10,11\) and the perioperative mortality rate from stroke and myocardial infarction combined, approaches 5% \(^4\).

3. Cerebral hyperperfusion syndrome.

Cerebral hyperperfusion syndrome (HPS) and haemorrhage are potentially lethal complications which could occur because of deregulated blood pressure. HPS can happen up to 7 days post operatively with an incidence of about 1%. This is thought to be a reperfusion injury where autoregulation is impaired. The clinical picture is similar to hypertensive encephalopathy with neurological deficits, seizures and headache. It requires urgent intervention (see flow chart).

4. Airway obstruction.

Surgical haematoma can cause airway obstruction.

Adequate blood pressure control is essential in order to reduce complications.

**Broad Recommendations**

Post-operative hypertension following carotid endarterectomy is common, especially in the first few hours after surgery due to blunted baroreceptor response. Most of these patients already have impaired cerebral auto regulation because of pre-existing hypertension. Patients require continuous intra-arterial blood pressure and ECG monitoring for at least the first 4-6 hours. Sub-optimal blood pressure control could lead to cardio-vascular and neurological insult, as well as increased incidence of bleeding which could potentially compromise the airway.

It has been generally agreed to aim for a systolic blood pressure of <160 mmHg and a diastolic of < 100 mmHg or +/- 20 % around the baseline value. This value might be higher in an already hypertensive patient.

Blood pressure control is more important than the choice of anti-hypertensive agent.
Involve surgeons/anaesthetists/intensivists/physician early, if any complications or concerns.

(See flow chart above)

**Treatment of Hypertension:**

*In Recovery/CCC:* Close monitoring is mandatory along with use of short acting anti-hypertensive drugs to control the blood pressure. The intravenous route (IV) is preferable in the immediate post-operative period. Use infusions (labetalol) if difficult to achieve blood pressure control after IV boluses. Try first line drugs IV, before considering second line drugs. Always check for pain and a full bladder as a treatable cause of hypertension before treatment with IV drugs.

GTN is an appropriate first line drug if there is any evidence of chest pain or ischaemia on ECG.

*Ward:* Reinstate antihypertensive regular medications, consider adding ACE inhibitors/calcium blockers/β-blockers or diuretics, if blood pressure not controlled. Sublingual nifedipine or crushed nifedipine is not appropriate for use, as they can cause unpredictable drops in blood pressure. Emergency intervention is needed if any new neurology develops or high blood pressure persists despite intervention.

**Treatment of Hypotension:**

In general aim to keep the systolic blood pressure above 110 mmHg. Check with anaesthetist/surgeon if different from the above target. Hypotension could be secondary to drug effect or fluid deficit, which need to be considered before drug treatment. Intravenous route (IV) is preferred with close monitoring. Again blood pressure control is the key, rather than the choice of drugs. If blood pressure control requires repeated boluses of vasopressors consider converting to infusions. (See flow chart above)

**Clinical audit standard**

After 1 year of implementation, the number of patients whose management has been concordant with the protocol can be audited. The audit standard is 100% adherence to the guideline.

**Summary of development and consultation process undertaken before registration and dissemination**

This version has been seen by Anaesthetics, Vascular team and other multidisciplinary teams.
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This version has been endorsed by the Clinical Guidelines Assessment Panel (CGAP).

Distribution list / dissemination method

Trustdocs

References


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