North Bristol NHS Trust

ANAESTHETIC DEPARTMENT POLICY

Anaesthesia for Stroke Thrombectomy

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This policy directly refers to practises and procedures by Anaesthetists and Anaesthetic Practitioners at North Bristol NHS Trust. Other staff groups should refer to clinical guidelines on trust intranet

EXECUTIVE SUMMARY

Policy Objective

Statement on standards expected by Anaesthetic Department for facilitating Stroke Thrombectomy by Anaesthetists and Anaesthetic Practitioners.

Key Policy Points:

1. Patients present emergently with limited advanced warning from throughout the region. These are high-risk cases requiring Consultant Anaesthetic input.

2. Avoid unnecessary delay. In patients who achieved substantial reperfusion at thrombectomy, each delay of 15 minutes to reperfusion was associated with a reduction in the chance of functional independence of 2.5% (Saver et al, 2016)

3. The procedure can be performed under LA, conscious sedation or GA. Evidence suggests general anaesthesia is associated with improved functional outcome.

4. Peri-procedural blood pressure control is important. Evidence suggests the optimal blood pressure range is a MAP of 70 to 90 mmHg. Confirm target range with the Neuroradiologist at the start of the procedure.

Introduction

There are five Interventional Neuroradiologists who perform the procedure (Drs Crossley, Cox, Minks, Mortimer and Wareham). The Neuroradiologists are available via a portable phone (Ext 49091).

This is a true time-critical emergency – the greater the duration before vessel recanalization the greater the degree of cerebral infarction. In patients who achieved substantial reperfusion at thrombectomy, every delay of 15 minutes was associated with a 2.5% reduction in the chance of functional independence (Saver et al, 2016)

Location

Stroke Thrombectomy is carried out within the IR Suite, usually in IR4. In daytime hours the nearest Theatre is the Vascular Hybrid Theatre.

Out-of-hours the suite is distant from the Emergency Theatres (Theatres 1 – 6). Trainee Anaesthetists working in IR should ensure the 9030 Bleep Holder is aware the case is taking place and, if necessary, request the presence of a second Anaesthetist at intubation and / or extubation.

Referral Process

Cases are referred via the Stroke Team and discussed with the Neuroradiologists before a decision to proceed is made. Approximately 75% of cases are external referrals. The Stroke ANP (Bleep 1464) or Stroke Consultant (Ext 49092) can be contacted to obtain medical details for patients referred.

Pre-Operative

This patient group can be challenging with chronic co-morbidities (AF, diabetes) pre-disposing to cerebrovascular disease and acute effects resulting from stroke (dysphasia, hemiparesis, visual field disturbance, vertigo, nausea and vomiting). In addition, patients may not be adequately fasted.

Basilar artery occlusions, which can interrupt the blood supply to the brainstem, are more commonly associated with a reduced level of consciousness and / or signs of brainstem dysfunction.

The combination of the above factors, the emergent nature of such cases and the more distant location of the IR Suite mean these are high-risk cases requiring Consultant Anaesthetic input.

Anaesthetic Conduct

Stroke Thrombectomy can be carried out under LA, conscious sedation or GA. Current evidence suggests general anaesthesia is associated with better functional outcomes. (Zhang et al, 2019; Schönenberger et al, 2019).

For those patients who pose a significant anaesthetic risk, local anaesthetic +/- conscious sedation can be considered after discussion with the Neuroradiologist.

Induction

For general anaesthesia a Rapid Sequence Induction will be required in most cases. Use of opiates (alfentanil 10mcg/kg, fentanyl 2mcg/kg, remifentanil 0.5mcg/kg/min at intubation) allow dose-sparing of propofol and obtund the pressor response to laryngoscopy. Vasopressors should be drawn up ready to treat hypotension.

Blood Pressure Targets

Limited data exists to guide Blood Pressure targets during the procedure. Historically, expert opinion recommended SBP 140-185mmHg (if thrombolysed) and SBP 140-220mmHg (if no thrombolysis).

A recent trial suggested critical MAP thresholds and durations for poor outcome to be MAP < 70mmHg for more than 10 minutes and MAP > 90mmHg for more than 45 minutes (Rasmussen et al, 2020).

Blood pressure drops should be avoided. A prolonged (>10mins) drop of 10% or more from baseline is associated with worse neurological outcomes (Valent et al, 2020).

- Consider target MAP 70-90mmHg
- Confirm target range with the Neuroradiologist at the start of the procedure

Monitoring

Invasive blood pressure monitoring is recommended for cases under general anaesthesia prior to induction. However, this should not delay the start of the procedure. A reasonable balance would be to have one attempt at siting an arterial line and, if unsuccessful, use non-invasive blood pressure cycling every minute initially. If the Neuroradiologist is using a femoral sheath in some cases it may be possible to attach invasive arterial pressure monitoring to this.

Position patient monitors on the left arm (Sats Probe, NIBP, IABP) and run monitoring leads down the arm and then across to the Anaesthetic Machine.

During the procedure the Neuroradiologists administer fluid intra-arterially (>500mls, more if the case is longer). Have a low threshold for inserting a Urinary Catheter.

Cases last 1-2 hours. Insert a temperature probe (avoid the nasal route if thrombolysed) and use a Bair Hugger (Upper Body). Depth of Anaesthesia monitoring is recommended to help titrate anaesthesia, including avoiding excessive anaesthesia and associated hypotension.

Maintenance including Physiological Targets

Anaesthesia can be maintained with TIVA or volatile. Remifentanil is useful to dose-spare anaesthetic agents and prevent coughing. Basic physiological targets are listed below:

Physiological Parameter	Target
Oxygen	SpO_2 94 – 98%. Avoid hyperoxia.
Carbon Dioxide	Maintain normocapnia
Blood Pressure	Consider MAP 70 – 90mmHg Confirm target BP Range with Neuroradiologist
Glucose	Aim normoglycaemia (BM 4 -11)
Temperature	Avoid Hyperthermia (Temp <37.5°C)

Sedation

For patients requiring sedation, options include: midazolam (10 – 20mcg/kg boluses), alfentanil (5mcg/kg boluses) or fentanyl (25mcg increments). No one agent has been proven clearly superior.

Titrate sedation to patient response aiming for a patient who is comfortable, easily rousable and able to follow commands. An anti-emetic, such as ondansetron, is useful to pre-emptively treat any nausea.

Administer supplemental oxygen and monitor exhaled CO_2 via face-mask – avoid hyperoxia as this may worsen reperfusion injury.

Post-operative

State and document the post-op target blood pressure at “Sign Out”.

Patients will usually return to the Stroke Unit for on-going care after recovery in the MediRooms. During recovery in the Mediroom care is shared between the Anaesthetic and Stroke Teams.

Discuss the following patients with Intensive Care:

- Patients who have a reduced GCS pre-op and require general anaesthesia
- Patients who have poor gas exchange precluding extubation
- Patients who require vasopressor infusions to maintain target blood pressure post-operatively
- All posterior circulatory strokes