Improving patient safety during position changes under general anaesthesia: “CHOPP check”- a new patient safety and educational tool.

Kareem Hussein
Our lady of Lourdes, Hospital. Dublin.

Shankar Lal (✉ shankar.anaesthesia1@gmail.com)
Beaumont Hospital, Dublin, Ireland.

Irene Leonard
Beaumont Hospital, Dublin, Ireland.

Michael Moore
Beaumont Hospital, Dublin, Ireland.

Short Report

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Abstract

The requirement to change position whilst under general anaesthesia may expose patients to significant risk. We devised and implemented a concise and comprehensive patient positioning safety tool with the aim of reducing risk and improve patient safety during position changes under anaesthesia.

Introduction

Optimal patient positioning during Neurosurgical procedures is essential in ensuring adequate surgical access to pathological lesions and optimal intracranial pressure and cerebral blood flow to facilitate safe surgical resection. Depending on the site of the lesion and the surgical approach, patients may need to be placed in either the supine, lateral, prone or sitting positions. Anaesthesia is usually induced with the patient in the supine position, and after induction of anaesthesia the patient is then moved into the required position for surgery.

Changing position whilst under general anaesthesia may expose patients to many potential risks including, but not limited to, physical injury, interruption of essential monitoring, airway compromise, haemodynamic instability, impairment of ventilation and dislodgement of intravascular access and haemodynamic monitoring lines. Serious adverse effects on pulmonary physiology may occur, including a reduction in functional residual capacity and ventilation-perfusion mismatch leading to hypoxaemia. Adverse haemodynamic effects, including reduced venous return, increased intra-thoracic pressure and reduced systemic vascular resistance, may result in significant hypotension, which could potentially compromise organ perfusion resulting in serious complications and adverse patient outcomes. These effects are more likely to be exaggerated in those with pre-existing comorbidities such as obesity and chronic cardiac and pulmonary disease. The anaesthesia closed claims project (2000-2014) reports that (prone position) spine surgery claims comprised more than 10% of total claims and that some were associated with severe permanent disability, primarily from nerve and eye injuries.¹

Safety checklists have become an established tool in improving patient safety and reducing the incidence of adverse events in medical practice.²

Aim:

- Reduce risk and improve patient safety during changes of position under anaesthesia.
- Develop a new practical educational tool for Anaesthesia and Neurosurgery staff to ensure safe and confident clinical practice when managing position changes of patients under anaesthesia.
Methods

After observation of existing operating team practices for a period of weeks we identified key patient safety risks and key times of greatest risk during patient position changes under anaesthesia in our Neurosurgical operating rooms. We then devised new pre- and post- position change safety checklists and introduced a brief safety pause to facilitate their completion. To enhance user-friendliness we developed the acronym “CHOPP check” CHange-Of-Patient-Position under anaesthesia check list.

CHOPP-check comprises safety checks at 2 key time points: a) before and b) after a change of patient position under anaesthesia. It focuses on 4 key domains of potential patient risk: haemodynamic stability, adequacy of ventilation, patient head-to-toe check and equipment function.

Important considerations in design were that CHOPP-check is:

- **Comprehensive**: incorporates a check on all patient safety risks we had identified during our period of observation of position changes.
- **User-friendly**: a) can be completed in 1-2 minutes and b) works with the ergonomics of the operating room and can be completed from a single standing position with only the patient “head-to-toe” check requiring movement around the OR.
- **Has potential for spread** to other surgical specialties for any procedure which requires a patient position change under anaesthesia.

Staff education was delivered to an initial pilot group. Laminated checklists were created and displayed in prominent locations at key sites. Practice on-site drills in addition to on-site simulation training of key operating room staff were undertaken prior to roll-out.

Results

After ‘CHOPP-check’ roll-out, staff surveys were undertaken to assess users’ perception of usefulness and impact on risk reduction. 80% of the respondents found CHOPP check to be user-friendly and supported its implementation. 70% of CHOPP checks performed identified potential patient safety issues. Common issues identified were traction with potential or actual disconnection of monitoring cables and vascular access lines during position changes. Less frequently, more serious, potential airway incidents were identified. Support was high amongst surgical and anaesthesia staff for the implementation of this new safety tool.

CHOPP-check is a new patient safety tool that focuses staff attention on potential hazards at times of increased risk during patient position changes under anaesthesia. It provides a concise and practical tool to guide operating theatre staff during position changes and enhances their ability to reduce risk and
improve patient safety. It has the potential for spread to other surgical and non-surgical specialties in which procedures require changes of patient position under anaesthesia.

**Declarations**

**Ethical Approval**

Not applicable

**Competing interests**

None

**Authors' contributions**

KH and SL initial write-up

MM and IL final write-up

All authors reviewed the manuscript before submission.

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**Availability of data and materials**

Not applicable

**References**


**Figures**
### CHOPP-check pre-position change

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
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| **Haemodynamics** | ECG · BP · SpO₂  
Monitored?  
Readings within safe limits? |
| **Ventilation** | EtCO₂ · Pao₂ · VTs  
Monitored?  
Readings within safe limits? |
| **Airway** | Airway device (ETT / LMA):  
Adequately secured?  
Designated Anaesthetist to ensure airway remains secure during move? |
| **Equipment** | Lines (IV, Arterial) - monitoring cable  
Ventilator tubing - urinary catheter:  
Free from traction during move? |

### CHOPP-check post-position change

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
</table>
| **Haemodynamics** | ECG · BP · SpO₂  
Monitored?  
Readings within safe limits? |
| **Ventilation** | EtCO₂ · Pao₂ · VTs  
Monitored?  
Readings within safe limits? |
| **Airway** | Airway device (ETT / LMA):  
Patient? Position at lips?  
Ventilator tubing safely positioned?  
Air entry:  
Bilateral and equal? |
| **Patient** | Eyes:  
Closed and protected? Free from compression?  
(padded if appropriate)  
Neck:  
Positioned safely?  
No hyper-flexion -extension-rotation?  
Abdomen: Free / not compressed? (if prone)  
Neurovascular points: Protected / padded?  
Nose, ears, shoulders, elbows, genitals, flabiae, heels:  
Free of pressure / passive stretch? |
| **Equipment** | IV fluids / infusions:  
Flowing freely? Injection port accessible?  
Pumps functioning? connected to power?  
Monitoring cables / ventilator tubing:  
Safely positioned?  
Warming device: Connecting? Setting appropriate?  
Thromboprophylaxis:  
TEIs on? Pneumatic compression required?  
Urinary catheter bag: Visible?  
Operating table control: Accessible? |

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**Figure 1**

**CHOP CHECK LIST**

![Bar Chart](image)

**Figure 2**

- Yes
- No

- User-friendly?
- Can reduce positioning related adverse events?
- Identified issues?
- Recommend implementing this checklist?