

Bone Cement Implantation Syndrome

Department / Service:	Anaesthetic department
Originator:	Lucy Leong/ Alag Raajkumar/ Charlie Docker
Accountable Director:	David Whitelock
Approved by:	Anaesthetics and Critical Care Governance meeting
Date of approval:	12 th November 2019
This is the most current document and should be used until a revised version is in place:	12 th November 2022

Policy Overview:
Bone Cement Implantation Syndrome Policy

Latest Amendments to this policy::
17 th January 2019 – Document reviewed with no changes required by Dr Lucy Leong

1. Introduction

The purpose of this document is reduce the risk from cemented hemiarthroplasty by encouraging joint decision making, team work and attention to detail.

The National Patient safety Agency (NPSA) has issued an alert in the past and subsequently Anaesthetic Sprint Audit of Practice (ASAP) collected prospective information on bone cement implantation syndrome (BCIS). This audit revealed evidence of cardiovascular compromise in some patients undergoing cemented hemiarthroplasty for hip fracture.

In the trust there have been cases of BCIS which have resulted in cardiovascular collapse requiring resuscitation.

2. Scope of this document

This policy will initially cover all cemented hemiarthroplasty's performed in the trauma theatres at the Alexandra and Worcester Hospital sites. If necessary will be rolled out to other sites in the trust.

3. Definitions

Bone cement Implantation syndrome (BCIS) is characterized by hypoxia, hypotension or both and/or unexpected loss of consciousness if patient is awake. This can occur around the time of cementation, prosthesis insertion, reduction of the joint or, occasionally, limb tourniquet deflation in a patient undergoing cemented bone surgery. Possibility of Bone Cement Implantation Syndrome occurred in approximately 20% of operations in which a cemented prosthesis was used.

Incidence of adverse effects during arthroplasty using cemented prosthesis

Grade 1 (hypoxia <94% or hypotension >20% fall in systolic blood pressure) 20%

Grade 2 (hypoxia <88% or hypotension >40% fall in systolic pressure or loss of consciousness) 3%

Grade 3 Cardiovascular collapse requiring resuscitation in 1%

Certain patient factors associated with increased risk of severe cardiovascular events during cemented hemiarthroplasty:-

1. Increasing age
2. Male sex
3. Significant cardiopulmonary disease
4. Use of diuretic medication

4. Responsibility and Duties

Surgeons and anaesthetist can modify their preoperative practice to reduce the risk of cardiovascular events and to improve the outcome following an event.

All members of the theatre team should be aware of the problems with femoral instrumentation and cemented prosthesis.

5. Policy detail

The potential for adverse events should be identified for each patient as part of the pre-list briefing before starting the theatre list and the World Health Organization (WHO) safe surgery checklist 'time –out'.

Cement Curfew

1. Identifying cases on the trauma list requiring Cement Curfew i.e. cemented hips.
2. Discuss cementing technique i.e. is cementing appropriate?
3. Does the anaesthetist need invasive monitoring? Cardiac output/"A" line/CVP line.
4. At the end of time out, assign roles to theatre team members.
5. Mark name against roles on cement curfew sheet/laminated card/white board/ name badges.
6. All members of the theatre team with assigned roles should be available in theatre.
7. Distractions-e.g. - like music to be minimised at the time of the cement curfew.
8. When cement is prepared for mixing, the scrub nurse informs the team that the cement curfew is about to start.
9. Lead surgeon informs the team when the cement is about to be inserted.
10. Lead anaesthetist ensures that the patient has a good cardiac output and increases the frequency of blood pressure measurement to stat/every 2.5 minutes in case of non-invasive method and confirms that the patient is ready for the cement insertion.
11. Cement is inserted with a third generation technique usually without excessive pressurization.
12. Lead surgeon informs team when the prosthesis is being inserted.
13. Lead surgeon informs the team when the hip is relocated.
14. Anaesthetist declares the end of the cement curfew.

6. Implementation

6.1 Plan for implementation

[A brief description of the plan for dissemination]

Communication via theatre band 7-8 to disseminate information to theatre staff

Case presented at anaesthetic directorate QIM meeting

6.2 Dissemination

Communicated to T and O directorate clinical director. Also to provide simulation training for T and O directorate.

6.3 Training and awareness

Training on bone cement implantation syndrome will be provided via simulation training on audit days by Dr L Leong/ Dr A Raakkumar

[This section should refer to training as identified in the Trusts Training Needs Analysis Appendix A of the Trusts Mandatory Training Policy.]

7. Monitoring and compliance

[This section should identify how the Trusts plan to monitor compliance with and the effectiveness of this Policy. It should include auditable standards and/or key performance indicators (KPIs) and details on the methods for monitoring compliance]

The NHSLA requirements are –

Organisations should measure, monitor and evaluate compliance with the minimum requirements within the NHSLA Risk Management Standards. This should include the use of audits and data related to the minimum requirements. The organisation should define the frequency and detail of the measurement, monitoring and evaluation processes.

Monitoring demonstrates whether or not the process for managing risk, as described in the approved documentation, is working across the entire organisation. Where failings have been identified, action plans must have been drawn up and changes made to reduce the risks. Monitoring is normally proactive - designed to highlight issues before an incident occurs - and should consider both positive and negative aspects of a process.