



Guidance and standard for postoperative level of care for children's scoliosis surgery

Executive Summary

- The [NHSE service specification](#) must be fulfilled for all centres undertaking paediatric scoliosis surgery
- Decision making for postoperative level of care should be individualised and this document acts as guidance only
- Scoliosis services need to work with anaesthetic, intensivist, paediatric and nursing colleagues to achieve safe levels of postoperative care
- Clear escalation pathways must be in place for patients managed in non-intensive care (Level 3) environments
- In general terms patients with the following risk factors should be considered for postoperative management in a level 2 OR 3 (HDU or intensive care) environment:
 - Preoperative respiratory issues (clinical, radiological or identified on respiratory function testing)⁵
 - Known cardiac comorbidities
 - Non-ambulatory neuromuscular^{7,9} or syndromal causes for scoliosis (if ambulatory and physiologically well and no other risk factors then can be individually risk assessed for ward level care)¹⁰
 - Procedures that may result in high blood loss e.g hemivertebrectomy or 3 column osteotomy
 - Severe developmental delay
 - Low weight or requiring nutritional support *preoperatively*
 - Combined anterior and posterior reconstruction (single staged surgery)^{7,9}
 - >270 minutes duration of surgery^{5, 10}
 - Physiological instability during surgery
 - Long acting opioid use during surgery⁷
 - Anterior only or posterior surgery with additional rib surgery are relative indications for level 2/3 care if the appropriate skill and competency for chest drain and respiratory observation are not present on the ward OR other risk factors are also present
- Patients without these risk factors could be considered for level 1 or ward level care with the appropriate nursing and medical support, analgesia and escalation pathways. There should be on-site level 2 care for escalation if required for these patients.

Introduction

Paediatric scoliosis surgery can be physiologically challenging for patients and so require levels of postoperative care that provide close observation along with the means to support organ systems as required. This is to manage systemic complications and also to prevent hypotensive episodes resulting in cord perfusion problems. Additionally, many currently used analgesic techniques mandate cardiorespiratory monitoring that ward level care may not be able to provide.

Level of care in the UK for children is classified as follows:

Level 0	Normal ward care in an acute hospital
Level 1	Basic Critical Care provision
Level 2	Intermediate Critical Care
Level 3	Advanced Critical Care

The detailed definition of what constitutes each level of care can be found [here](#)¹.

A blanket approach of managing all postoperative children's scoliosis surgery through a minimum of a level 2 service for close monitoring and early intervention is valid and has been widely practiced.

However, challenging resources and conflicting priorities do demand a need to evaluate the possibility of "return to ward" care for some children's scoliosis surgery patients. There are a number of units in the UK and internationally that have managed this safely and successfully.

Additionally, there is some evidence of a shorter and more cost-effective postoperative course when critical care is not used in the right patient group².

This document provides guidance of the type of case that is best managed in a level 2 or 3 environment and those that with individualised assessment could return to the ward.

Who does this guidance affect?

Patient group

All children undergoing scoliosis surgery

Clinicians

All spine surgeons undertaking children's scoliosis surgery, advanced spine practitioners, anaesthetists undertaking children's scoliosis surgery, children's critical care services, children's surgical wards, pain services.

Managerial

All managers involved in managing a children's scoliosis service.

Development of a "return to ward" policy for scoliosis must have involvement of all the key stakeholders to ensure safe care is provided with adequate analgesia and with escalation pathways that are known to all.

Identifying patients for Return to Ward care

Patients that could return to ward postoperatively should be identified within an agreed framework but the final decision must be individualised.

Patients without the risk factors for level 2/3 care listed below could be considered for level 1 or ward level care with the appropriate nursing and medical support, analgesia and escalation pathways. As such the minimum of level 2 care should be available on site if escalation is required.

Risk factors for needing organ system support (including intubation) or preventing hypotensive episodes have been identified.

These risk factors for requiring level 2/3 facilities postoperatively include:

1. Preoperative respiratory issues (clinical, radiological or identified on respiratory function testing)⁵
2. Known cardiac comorbidities
3. Non-ambulatory neuromuscular^{7,9} or syndromal causes for scoliosis (if ambulatory and physiologically well and no other risk factors then can be individually risk assessed for ward level care)¹⁰
4. Procedures that may result in high blood loss e.g. hemivertebrectomy or 3 column osteotomy
5. Severe developmental delay
6. Low weight or requiring nutritional support *preoperatively*
7. Combined anterior and posterior reconstruction (single staged surgery)^{7,9}
8. >270 minutes duration of surgery^{5, 10}
9. Physiological instability during surgery
10. Long acting opioid use during surgery⁷
11. Anterior only or posterior surgery with additional rib surgery are relative indications for level 2/3 care if the appropriate skill and competency for chest drain and respiratory observation are not present on the ward OR other risk factors are also present

This list is not exhaustive and patients considered for return to ward must be individually risk assessed to ensure this is appropriate. Similarly, some units may have robust processes in place allowing return to ward for higher risk patients (e.g. well neuromuscular patients or anterior surgery patients). This guidance does not replace local operating procedures with established risk assessment and escalation in place. It can be used as a guide to develop a local operating procedure.

Some of the risk factors may only be determined intraoperatively (e.g. duration of procedure) and so all facilities carrying out this surgery must have the ability to undertake level 2 and or level 3 care as per complex spine surgery service specification.

Preoperative considerations

The institution should fulfil the current service specifications for undertaking children's scoliosis surgery.

A comprehensive preoperative assessment is vital to identify risk factors requiring level 2 or 3 care. This includes but is not limited to:

1. Thorough clinical and radiological assessment
2. Weight, height and nutritional assessment
3. Respiratory function tests
4. Cardiology evaluation if appropriate
5. MDT agreement about the surgical plan
6. MDT discussion (including paediatricians and anaesthetists as appropriate)
7. Manage anaemia preoperatively: <https://cpoc.org.uk/guidelines-resources-guidelines/anaemia-perioperative-pathway>
8. An assessment of preoperative analgesic requirements
9. Inform patient and carers with regards to postoperative care and the potential for moving between levels of postoperative care

Intraoperative considerations

If a patient has been deemed suitable for "return to ward" care, the success of this can be optimised by intraoperative management.

This includes but is not limited to:

1. Maintaining euvolaemia
2. Preventing significant blood loss (surgical haemostasis, use of cell saver, tranexamic acid and other adjuncts)
3. Avoiding prolonged deep levels of anaesthesia
4. Avoiding long acting opioids
5. Avoiding hypothermia
6. Efficient operative techniques to reduce surgical time
7. Utilising opiate sparing analgesic techniques

Postoperative considerations

For patients suitable for return to ward care consider the following:

1. An approved care pathway for postoperative scoliosis care should be established
2. Appropriate skill mix and nursing members to care for postoperative scoliosis patients
3. Nursing staff competent in the full assessment of a postoperative scoliosis surgery patient (including neurological observations)
4. Support from spine surgical team (ANP and medical staff) for face to face review and reassessment as required by ward staff
5. Agreed PEW score for escalation and early adjustment of level of care
6. Adequate (ideally opiate sparing) analgesia
7. Early sitting and early mobilisation
8. Optimise nutrition post operatively
9. Encourage breathing exercises post operatively

Other considerations

1. Consider scoring systems when assessing patients⁶
2. Consider rapid step down models – some patients may initially require level 2/3 care. If they remain physiologically stable for 4-6 hours (including hypotensive episodes)⁸ then they may be considered for step down to lower levels of care

References

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