

PREOPERATIVE / POSTOPERATIVE CARE OF THE SCOLIOSIS / KYPHOSIS PATIENT - CHW

PRACTICE GUIDELINE[®]

DOCUMENT SUMMARY/KEY POINTS

- Surgery to the spine can be done for many reasons such as fractures, degenerative disease, scoliosis, kyphosis, spinal stenosis, tumours and other defects.
- Appropriate preoperative preparation is important to ensure patient safety.
- Staff should be aware of the appropriate post-operative care of the patient in order to avoid potential complications and ensure patient safety.
- This practice guideline outlines the pre and post-operative spinal care of the scoliosis/kyphosis patient.
- This includes spine operative techniques, pre/post-operative spinal care and discharge information.

This guideline outlines the preoperative workup phase and the post-operative care post-surgery day 1 – discharge day 7 – 10.

CHANGE SUMMARY

- Due for mandatory review – no major changes made.

READ ACKNOWLEDGEMENT

- Clinical staff caring for spinal surgery patients with scoliosis/kyphosis should read and acknowledge this document.

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

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This Guideline may be varied, withdrawn or replaced at any time.

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1 Anterior Spinal Fusion / Posterior Spinal Fusion

Definition

A child/adolescent may require surgery on the spine for many different reasons, such as fractures, degenerative disease, scoliosis, kyphosis, spinal stenosis, tumours or other defects. Not all children/adolescents with a spinal deformity require surgical intervention. Surgical intervention is determined by the surgeon in relation to degree of the curvature, deformity decompensation and neurologic status¹¹.

A spinal fusion is the joining of vertebrae to stabilise the spine; this is achieved by using bone grafts and instrumentation. Bone grafts are used to fuse the vertebrae to form a solid stable section of the spine while instrumentation is used to straighten the spine into a stable position while healing occurs. Instrumentation, called implants are metallic and come in many shapes and sizes, i.e. hooks, rods, screws, wire loops and cables. There are two common surgical approaches used, the Posterior approach involves a long straight incision down the midline of the back, the Anterior approach involves a thoracotomy or thoracoabdominal incision. Instrumentation is not always used when an anterior spinal fusion is performed; some children require both an anterior and posterior procedure to correct a spinal deformity¹¹.

Types of Instrumentation:

- Expedium Titanium
- Legacy Stainless Steel
- K2M Range spinal system

General Principles

To adequately prepare and manage children undergoing spinal surgery in order to enhance and minimise post-operative complications.

Pre-operative Preparation

1. Spinal work-up one week before surgery in Medical Day Stay. The child will have blood work-up (FBC, EUC,COAG,X match), MSU, MRSA Swabs, X-rays (hard copy 3ft spine PA/Lat left and right benders), respiratory function test and consultation with Anaesthetist, Respiratory team, Orthopaedic Resident and Nurse Practitioner.
2. If there are any signs of infection e.g. Chest infection or urinary tract infection surgery may be cancelled.
3. The Parent and child will receive appropriate information in relation to the procedure and after care provided by medical, nursing and allied health staff. It is important that the family and health professionals outline the desired goals and outcomes associated with the procedure.
4. Discuss approximate length of stay with the family.
5. Commence organisation of community supports if home care is required after discharge.
6. Check skin integrity

7. Check vital signs, temperature, pulse, respiration and blood pressure.
8. Measure patient's height and weight.
9. Check consent form
10. Fasting times and premedication ordered. Children should fast from 0200hrs solids, 0400hrs clear fluids.
11. All patients should be admitted day of surgery at 7am via the day stay unit.
12. All test results should be checked the following day and any abnormalities acted on. If the patient is found to be positive for MRSA or sensitive *Staph aureus*, treatment should be commenced as per [Appendix 1](#)/ [Appendix 2](#)

Post-Operative Management

(Summary of care as per [Appendix 3](#) – Spinal Patient Care Guidelines)

Positioning

- Postoperatively the child may lay/ sit as comfortable in bed unless postoperative orders indicate otherwise.
- The child should be log rolled every 2 hours to avoid pressure areas and to reduce pooling of pulmonary secretions¹³. Check skin for areas of breakdown.
- Use pillows to support back and place a pillow between the legs to roll patient as this helps maintain correct body alignment. Keep shoulders and hips in alignment.
- Incorrect position or lifting patients by the armpits may dislodge hooks and rods. Sitting the child/adolescent is achieved by rolling the patient to the edge of the bed, then position the child/adolescent on their side and they push up with their arms as the legs swing over the side of the bed in one motion¹¹.

Observations

- Temperature monitored 2-4 hourly to detect post-operative infection. Intravenous antibiotics given prophylactically until indwelling catheter is removed.
- Pulse and Respirations are monitored hourly whilst on narcotic infusion.
- Blood pressure should be recorded hourly for 6 hours if the child/adolescent has a paravertebral infusion, then 2nd hourly in the acute post-operative period. The high risk of blood loss and the use of hypotensive anaesthesia make the monitoring of blood pressure during the first 72hrs imperative¹¹. A desired MAP will be indicated in the postoperative orders; MAP should be monitored and maintained for the first 72 hours. If MAP below desired level follow escalation protocol. Hourly neurovascular observations should be monitored and recorded for the first 48 hours and then 4th hourly until discharge. Neurological loss has been reported to occur 36 hours or more after surgery, so neurovascular evaluation should continue to be monitored throughout the child/adolescent hospitalisation on a regular bases¹¹. If there is a decrease in neurovascular status, please. Contact the orthopaedic registrar immediately, if no

response within 10 minutes, contact the spinal fellow via switch board, if no response please contact the spinal consultant immediately.

- Oximetry is required in the immediate post-operative period to detect oxygen desaturation. Oxygen therapy is commonly required, especially after an anterior fusion

Physiotherapy

All spinal fusion patients should have BD chest physio, starting in the immediate post-operative period. All patients' respiratory function is assessed by physiotherapy post operatively and treatment prescribed as indicated e.g. Deep breathing exercises and positioning.

Pain Management

- Pain relief is usually managed using a regional infusion or an epidural in combination with a narcotic infusion or patient controlled analgesia (PCA). The regional/epidural infusion usually remains in place for 48-72 hours. The narcotic infusion or PCA usually remains in place for 4-5 days post-surgery.
- Oral pain (endone) relief is commenced when tolerating oral fluids and narcotic infusions are ceased.
- Paracetamol should be used in conjunction with infusions to enhance pain relief. This can be given immediately post operatively either rectally or orally.
- Regular Pain Team Consultation

Nutrition and Hydration

- Nil by mouth until bowel sounds resume. Ice to suck over the first 24 hours is permitted. Diet is then upgraded as tolerated. If abdominal distension, nausea or vomiting occur, diet should be restricted until symptoms pass. An Ileus may develop secondary to narcotic use or surgery¹².

Intravenous therapy

- Monitor and record fluid balance. An in dwelling catheter is left insitu for 48-72 hours. Monitor output closely for 72 hours post operatively. Fluid imbalance may occur due to the hypotensive anaesthetic or fluid and blood loss causing a temporary slowdown decreasing urine output. Daily electrolytes need to be monitored in relation to a fluid overload, dehydration and inappropriate antidiuretic hormone secretion^{11, 12}.
- Check haemoglobin day 1 & 3 post operatively. A fluid balance shift secondary to blood loss and the use of anaesthetic can occur. A blood transfusion may be required if haemoglobin falls sufficiently¹¹.

Wound Care

- If bleeding or oozing excessively from wound, prior to 48 hours reinforce and report and document blood loss.
- Wound dressing left intact for 5 days and then changed to observe suture line. It is recommended that a sterile technique be used when changing the dressing¹³. Leave sterile strips insitu and spray with opsite spray.

- The child may shower at day 5 after the wound has been reviewed.
- Anterior spinal fusions have an underwater sealed drain insitu. This is usually left on suction unless otherwise noted in the post-operative orders. The underwater sealed drain is removed after 48 hours if oscillation and drainage cease, the drain is sutured in, and the suture needs to be removed before taking out the drain.
- Wound drain is insitu for 48 hours. Losses should be monitored 1/24 on fluid balance chart for 24 hours then 6/24 until removed. Wound drains may need to be changed in the first 24 hours.
- Intravenous antibiotics are given prophylactically until the chest drain, wound drain and IDC are removed. (as per [Appendix 2](#))

NB: If the patient returns from theatre with wound drain unvacced, ask orthopaedic registrar who attended theatre if this is for a reason - that is to stop excessive loss.

Hygiene

- Frequent mouth care required when NBM.
- 4 hourly peri toilets needed whilst IDC insitu
- Daily sponge whilst on bed rest, when mobilising the child/adolescent can shower with assistance. The use of a shower chair is necessary
- If wearing a jacket/brace check with surgeon if jacket can be removed whilst showering
- Be aware of correct lifting and positioning techniques when moving the child/adolescent. Use a hoist if the child/adolescent uses a wheelchair

Mobilisation

- Following an anterior spinal fusion, without instrumentation, bed rest is maintained until the posterior fusion is completed.
- Active limb exercises to be encouraged frequently whilst on bed rest. Contact physiotherapy for specific exercise regime
- Wearing of jackets should be as per doctor's orders.
- Once able to mobilise, the child/adolescent is slowly progressed from sitting out of bed to walking/wheelchair short distances.
- Returning to normal activities will be limited and should be discussed with orthopaedic surgeon.

Escalation protocol

- **Contact orthopaedic registrar via hospital page.**

- **If no response within 10 minutes, contact spinal fellow via switch board.**
- **If no immediate response contact spinal consultant via switchboard.**

Optimal Outcome

Stabilisation and/or Correction of Spine: Prevention of complications in relation to surgery and rehabilitation

Psychology well being: Encourage the child/adolescent to participate in varying aspects of their care. Empowerment over decision making gives the child/adolescent the control to promote a positive healing experience¹².

Self Care: Promote maximum self care for the child/adolescent. Frustration with mobilisation and problems associated with body image need to be acknowledged and discussed openly.

Mobilisation: The child/adolescent should be able to mobilise safely. A gradual increase in physical activity should be encouraged as instructed by orthopaedic guidelines.

Potential Complications

Pulmonary Complications

- **Pneumothorax/Pneumonia /Plural effusion:** Potential complication from lying flat, anaesthetic, opioids and chest drain. Close monitoring and physiotherapy are required to decrease the incidence of respiratory complications
- **Chyle effusion:** Chest tube fluid consists of chyle rather than pleural fluid. Close monitoring of chest drain fluid required¹⁴.

Neurovascular Complications

- **Transient paresis/ Paralysis:** Motor and sensory loss can occur due to compression of the spinal cord. It is important to monitor neurovascular status hourly for 48 hours post-surgery and frequently thereafter. Even after 72 hours there can be a rapid motor and sensory loss, thereby the need to check neurovascular status throughout hospital stay remains a priority¹⁴.

Blood Loss

- There is a potential for moderate to severe blood loss during the operation and post-operatively. Blood loss from wound drains and chest drains needs to be monitored closely. Blood should be collected daily for Haemoglobin levels. A blood transfusion may be required if haemoglobin falls sufficiently¹¹.

Inappropriate Antidiuretic Hormone Secretion (SIADH)

- Diminished urinary output is common during the first 72hrs, as a result of fluid and blood loss
- Hyponatremia with associated increased in urine sodium are signs of SIADH. Test urine for specific gravity to assure proper hydration in conjunction with daily electrolytes¹³

Ileus and Gastrointestinal Distress

- Common problem associated with the disruption of the nerves to the peritoneum and handling of the peritoneum during surgery. Also associated with the use of opioids when using narcotic infusions. Bowels sounds should be present before oral diet and fluids commenced²³.

Skin Integrity Compromise

- Strict pressure care is required to reduce the risk of developing a pressure sore. Areas such the heels, shoulders, hips and back should be examined closely for skin breakdown. Immobility increases the risk of developing a pressure sore¹².

Wound infection

- Wound infections are a common complication of surgical procedures. Protection of the wound during the early post-operative period is essential. An elevated temperature and an increase in the white cell count are the classic signs of wound infection. The wound should also be observed for any signs of infection/breakdown¹¹.

Urinary Tract infection

All children having a spinal fusion have indwelling catheter (IDC) inserted in theatres. Urinary tract infections are common when an IDC is inserted, therefore beware of the signs and symptoms of a urinary tract infection and remove the IDC when the epidural infusion is ceased. The risk for a urinary tract infection increases the longer the IDC is in.

Requirements for Discharge

- Child can mobilise safely, either with wheelchair or walking, depending on child's individual needs
- Child can safely transfer from bed to chair
- Tolerating a normal diet
- Parents instructed on wound care, are aware of the signs of wound infection
- If child requires a brace/jacket, education given to the care of the brace/jacket in relation to skin
- Hard Copy x-ray of spine prior to discharge
- Prescriptions for medications arranged and weaning plan given
- Follow up appointments arranged
- Contact phone numbers of health professionals given to parents/carer
- Follow up with GP at 1 week for wound check
- Follow up at 4 - 6 weeks with orthopaedic consultant, with a new x-ray.

2 Care of a Child in a Polythene Jacket

Definition

A Brace/Jacket is sometimes used post-operatively to stabilise the spine. There are many different types of jackets used depending on the level of the surgery required on the spine. Most jackets are made out of polythene. The Orthotic department measures and makes the jackets.

General Principles

- Skin under the jacket must be checked daily for signs of pressure, irritation and breakdown. Pay particular attention to the chin, shoulders, hips and the occipital and parietal areas of the scalp for pressure areas.
- A close fitting cotton T-shirt should be worn under the jacket to avoid direct skin and jacket contact¹¹. This should be changed daily or more often if saturated with perspiration.
- Do not use any creams or powder under the brace, they will cause skin irritation¹¹.
- For hygiene, remove the front of the jacket whilst the child/adolescent is lying supine. Sponge the child/adolescent and the inside of the jacket ensuring both the skin and jacket are well dried. Replace the front of the jacket and secure. Turn the child/adolescent and repeat the procedure.
- The child/adolescent spine must be kept in alignment when the jacket is unsecured.
- Visa jackets: used to stabilise the cervical spine

Hygiene instructions

- i. To clean the patients back, have two towels rolled up in logs.
- ii. Turn child prone, place one towel horizontally under the forehead and the other under the chin; this enables the face to be clear of the mattress.
- iii. Unfasten the straps again. Check the back of the head for pressure areas, matt hair, red or broken areas. Wash the back and dry. Clean inside of the jacket as per the front.
- iv. Change any wound dressings 48 hours post operatively or as necessary. Report decree of swelling around neck

Clothes may be worn over the jacket. A larger size may be needed for ease of dressing.

Hazards/OH&S

Staff: As per Manual Handling Polices

Care givers: Teach parents/cares the correct lifting and transferring techniques

Infection Control

Standard precautions apply-Risk of body fluids

Education /Evidence

The care described in this policy, for a child/adolescent following a spinal fusion is consistent with evidence provided in the current literature reviewed.

References and Bibliography

1. Ball, P. Critical care of a spinal cord injury. *Spine*. 2001 26(24S), 27-30.
2. Reynolds, R. Paediatric spinal injury. *Current Opinion in Orthopaedics*. 2000 11(3), 210-214.
3. Hauswald, M. & Braude, D. Spinal immobilisation in trauma patients: is it really necessary? *Current Opinion in Critical Care*. 2002. 8(6), 566-570
4. Phillips, L. Pressure ulcers-prevention and treatment guidelines. *Nursing Standard*. 1999. 14(12), 56-62.
5. Hicken, B., Putzke, J. & Richards, S. Bladder management and quality of life after spinal cord injury. *American Journal of Physical Medicine & Rehabilitation*. 2001. 80(12), 912-922.
6. Simpson, L. Indwelling urethral catheters. *Nursing Standard*. 2001.15(46), 47-56
7. Biering-Sorensen, F. Urinary tract infections in individuals with spinal cord lesion. *Current Opinion in Urology*. 2002. 12(1), 45-49.
8. Bryant, G. When spinal cord injury affects the bowel. *RN*. 2000 63(2), 26-30.
9. Maher, A., Salmond, S. *Orthopaedic Nursing*. Philadelphia: W.B. Saunders. 2002 pp515-554.
10. Colachis, S.. Medical Grand Rounds : Autonomic hyperreflexia with spinal cord injury. *Topics in Spinal Cord Injury Rehabilitation*. 1997 3(1), 71-81.
11. Rodts, M. Disorders of the spine.
12. Slote, R. (2002). Psychological aspects of caring for the adolescent undergoing spinal fusion for scoliosis. *Orthopaedic Nursing*, 21(6), 19-30.
13. U.S. Department of Health and Human Services: Hospital Infections Program, National Centre for Infectious Diseases, Centres for Disease Control and prevention Public Health Service. (1999). *Guidelines for the Prevention of Surgical Site Infection*. Atlanta, Georgia.
14. Grossed, S., Winter, R., Lonstein, J., Denis, F., Leonard, A. & Johnson, L. (1997). Complications of anterior spinal surgery in children. *Journal of Paediatric Orthopaedics*, 17(1), 89-95.
15. Bridwell,G., Anderson,P.,Boden,S., Vaccaro,A. & Wang.,J.(2007). Whats new in spine Surgery.The *Journal of Bone and Joint Surgery*,89, 1654 – 1663.

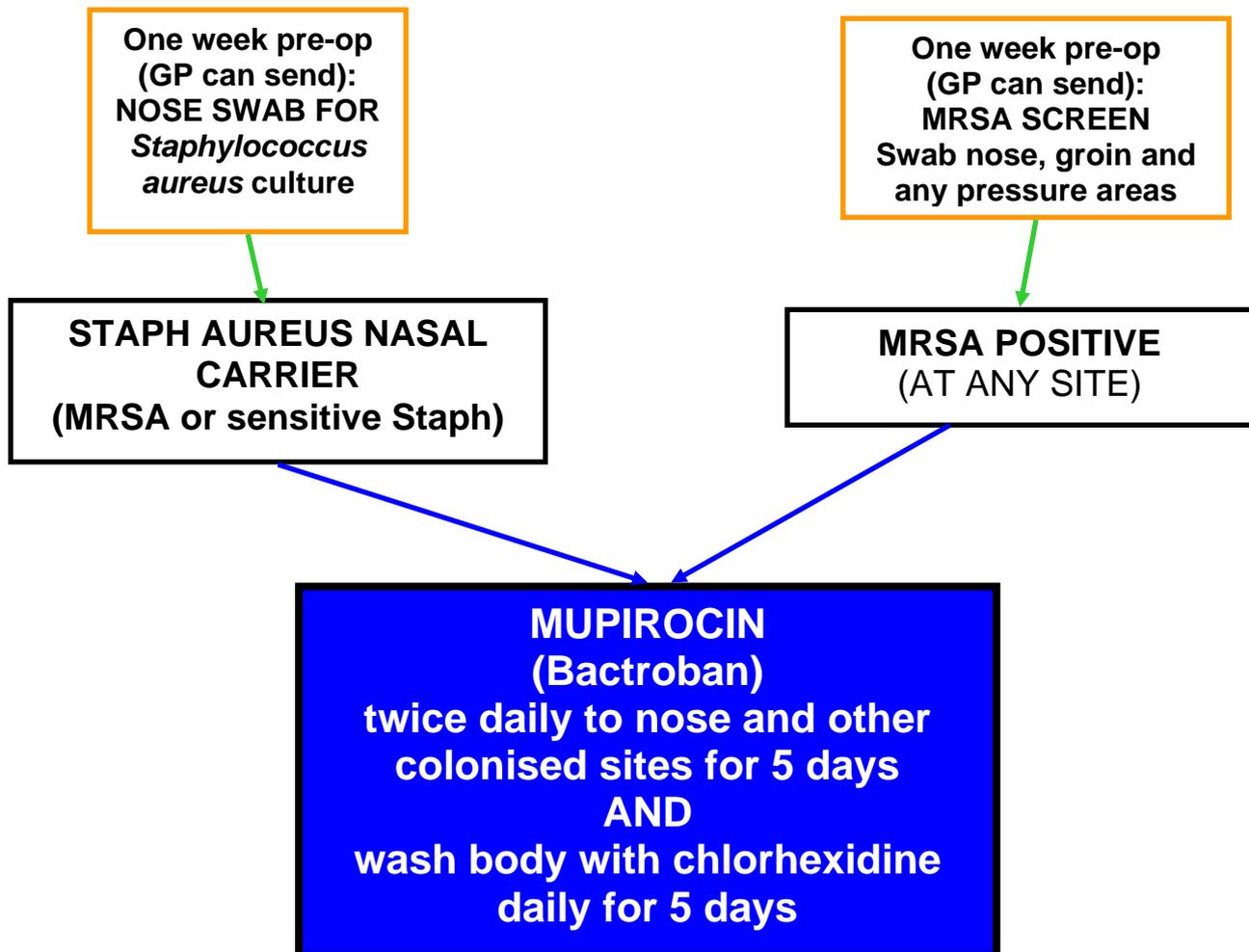
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Appendix 1

Flowchart 1 – Screening for Staphylococcal before Spinal Surgery

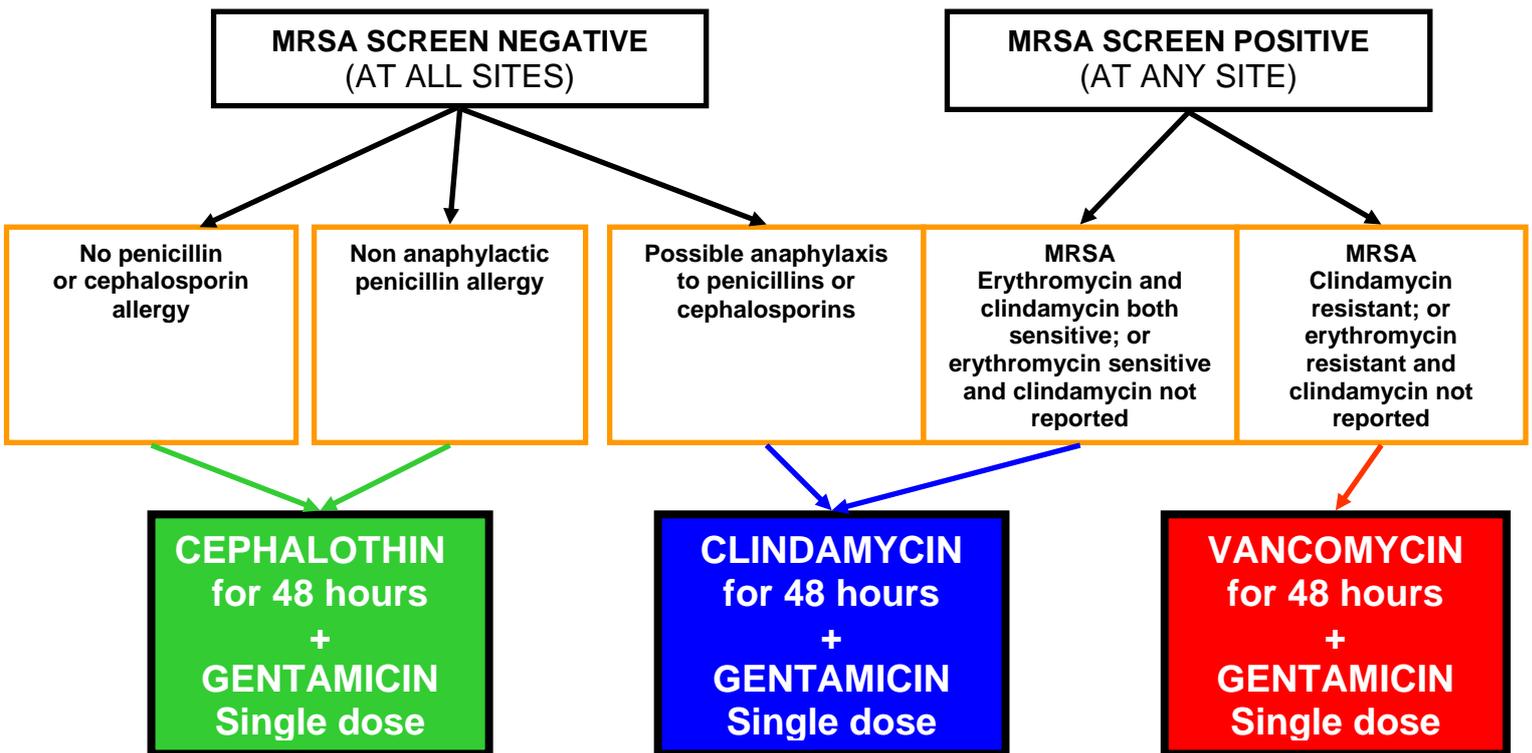
SCREENING FOR STAPHYLOCOCCAL CARRIAGE BEFORE SPINAL SURGERY



Appendix 2

Flowchart 1 – Antibiotic Prophylaxis Regimen for Spinal Surgery

ANTIBIOTIC PROPHYLAXIS REGIMEN FOR SPINAL SURGERY



DRUG	INITIAL DOSE / COMMENCEMENT	RE-DOSE IN THEATRE	CONTINUE POST-OP
*Cephalothin	Dose: 50mg/kg/dose IV by slow push at induction	YES: Administer a second 50mg/Kg dose IV after 3hrs for prolonged procedures	YES: Administer subsequent doses at 25mg/kg/dose 6-hourly IV for a maximum total duration of 48hrs
*Clindamycin plus Gentamicin	Dose: 10mg/kg/dose. Infuse IV at a rate not greater than 30mg/min at time of induction. Dose: 7.5mg/kg <10 years old OR 6mg/kg if 10 years or older IV by slow push at induction	NO NO	YES: 10mg/kg/dose 8-hourly for a maximum total duration of 48 hrs NO
* # Vancomycin plus Gentamicin	Dose: 15mg/kg/dose (max 1.5g/dose). Infuse over at least 1 hour at a rate not greater than 10mg/min. Infusion should be completed within the hour prior to skin incision. This will usually require commencement prior to transport to the anaesthetic bay Dose: 7.5mg/kg <10 years old OR 6mg/kg if 10 years or older IV by slow push at induction	NO NO	YES: 15mg/kg/dose (max 750mg) 6-hourly IV for a maximum total duration of 48hrs. Trough levels to be measured prior to 5 th dose (aim: 10-20mg/L) NO

NOTE: *If known allergy, discuss with infectious diseases.
 #Vancomycin dose reduction required if impaired renal function.

Appendix 3

Guidelines for Spinal Patient Care

(These act as a guide only, please consult the patient notes for orders)

Day 0: X-ray in recovery

Neurovascular observations q1h

Temperature q4th, Respirations and pulse hourly.

Blood pressure hourly for 6 hours, then 2nd hourly

Pulse, respirations hourly

Regular PAC

Ice to suck only

Day 1: Check FBC, UEC, LFT

Only consider transfusion if Hb < 80

Neurovascular observations q1h

Ice to suck until bowel sounds present, then progress to clear fluids

Chest physiotherapy

Routine Observations (2hrly BP, 4th hourly temp, hourly pulse, respirations and saturation monitoring)

Regular PAC

Day 2: Wound drain out at 48 hours if minimal/no drainage

Chest drain out at 48 hours

- minimal drainage should be occurring
- double clamp chest drain at 6am, chest x-ray at 10am, review x-ray
- If x-ray satisfactory remove chest drain as per protocol and repeat x-ray

Continue IVab.

Neurovascular observations hourly for first 48hours then 4th hourly

Routine Observations (4hrly BP and temp, hourly pulse, resps and saturation monitoring)

Free Fluids progress to light diet in evening if bowel sounds present and nil nausea or vomiting. Movicol to be ordered once light diet is commenced

Regular PAC

Chest Physio

Begin to sit patient in bed

Day 3: Epidurals **must** be ceased and removed by 72 hours

- cease 6am
- remove IDC at 10am
- notify team if has not passed urine by 3pm
- If needed re-catheterise and leave catheter in place for a further 24hours, give a stat dose of intravenous gentamicin

Cease antibiotics when IDC and other drains are out.

Send MSU to pathology

Continue PCA

Encourage mobilisation (sit in bed)

Repeat bloods (FBC, EUC)

Regular PAC

4th Hourly Neurovascular observations

Routine Observations (4hrly BP and temp, hourly pulse, respirations and saturation monitoring)

Chest Physio

Sit patient in bed/ out in chair

Day 4: Continue PCA for 24 hours after epidural out

- Wean to oral analgesics
- Maintain oxygen monitoring until all narcotics ceased

4th Hourly Neurovascular observations

Encourage mobilisation (sit out of bed)

X-ray 3ft erect PA/lat spine once mobilising (hard copy)

Regular PAC

Routine Observations (4hrly BP and temp, hourly pulse, respirations and saturation monitoring, until PCA off then 4th hourly observations)

Sit out of bed / mobilise gently

Day 5: Continue mobilisation (mobilise gently around room /ward)

4th Hourly Neurovascular observations

(Onwards) Analgesia as required

Change wound dressings (Day 5) Leave steri-strips[®] intact

- Aim for discharge 7 – 10 days post operatively
- Discharge letters, etc, supplied by NP prior to discharge

Follow up: LMO 1 week post discharge for wound check

Follow up OPD 6 weeks with an x-ray