An evaluation of a portable Single Use Negative Pressure Wound Therapy (NPWT) dressing to reduce wound complications in Paediatric Spinal Surgery

Introduction

Corrective spinal surgery in paediatric patients is essential in order to improve physical capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity surgery is often performed to help with patient mobility and to improve overall patient capability and importantly to improve quality of life for the patient. In spinal deformity

Scoliosis is the term used to describe a curvature of the spine, there are four main types of scoliosis discussed in the literature these are:

- Idiopathic where the cause is unknown
- Neuromuscular where the cause is related to a neuromuscular condition which affects the nerves and muscles. These include muscular dystrophy, cerebral palsy, spinal muscular atrophy and spina bifida.
- Congenital where the spine does not form properly in the womb during development.

Idiopathic scoliosis accounts for most spinal curvatures and can develop at any time during childhood and adolescence. The primary symptom of scoliosis is the alteration in body shape which may in turn affect the child’s confidence. If the curve is in the chest area there may also be a noticeable change in the shape of the rib cage. Treatment will be dependent on the level of the deformity, so may involve the use of a spinal brace where moderate deformity is present, however, for more pronounced deformity spinal surgery may be necessary.

Surgical intervention is recommended for patients with spinal curves greater than 40-50 degrees and the objective of the surgery is to straighten the spine and maintain the correction to ensure that the curve will not progress into adulthood. Surgery normally involves fusing the vertebrae along the curvature and then supporting this fusion with screws and rods. This is mostly performed prophylactically as was the case with the patients in this evaluation. Anterior surgery is performed from the side of the body. Patients may also often present with co-morbidities which can impact on their ability to heal and this may impact on post-operative infection rates.

Surgical site infection can pose a significant threat to the outcome for these patients and deep infection may lead to osteomyelitis which may impact on the surgical repair and patients admitted for insertion of growth rods (Shila is the surgeon who founded the technique, magnetic and conventional). Those excluded from the study include growth rod lengthening / revisions, anterior fusions, combined spinal fusions, revisions of fusions, 2 stage fusions and trauma and joint neurosurgery / spinal surgery cases.

Patients have PICO applied in theatre and the dressing is changed on day of surgery, normally day 5 or day 7. The wound is assessed on removal of the dressing and if necessary a further dressing is used. Further telephone follow up will be carried out and all clinicians involved in the patients care will be contacted to give feedback as to the presence of absence of infection. ASEPSS’s wound scoring system is being used to assess all wounds in order to diagnose wound infection.

Interim Results

39 patients have been recruited to the study so far, of this 2 patient have had a suspected superficial wound infection, giving an overall infection rate of 5%. Both patients had American Association of Anesthesiologists (ASA) scores of 4 when assessed preoperatively. No patients developed a deep infection since the PICO evaluation was commenced.

In years 2010-2011 there were 5 infections in 171 patients, with 25 patients lost to follow up. 2 of these infections were deep tissue infections. During 2011-2012 6 infections were reported in a population of 93 patients of which 1 was a deep infection.

The PICO dressing has managed the exudate from the wound, stays in place for 7 days and in addition the presence of negative pressure appears to help ‘split the wound’ and keep the wound edges apposed.

Discussion

The use of Negative Pressure Wound Therapy on surgical incisions has been increasingly reported in the literature for a number of clinical indications. Pioneered by Stannard et al., (2009) in orthopaedic trauma, further studies in cardiothoracic surgery (Grauhan et al., 2012) and caesarean section surgery (Bullough et al., 2012) have highlighted the benefits of negative pressure in high risk surgical wounds.

Bullough et al., (2012) studied 50 patients undergoing caesarean section with BMI >35, of whom no patients developed a wound infection. Wochl et al., (2003) in a study of 4000 C- section patients suggested that the infection rate for high BMI patients to be around 19.28%. This would suggest that negative pressure may have a role to play in infection prevention in this patient group.

In this evaluation 2 patients developed a superficial infection which were treated with 5 days of oral antibiotics, both patients had an ASA score of 4 which was a result of significant comorbidity prior to surgery being carried out.

While firm conclusions cannot be drawn from this relatively small number of patients, one of the key outcomes of the evaluation thus far has been the absence of deep infections. Deep infection following this type of surgery can be catastrophic for the patient and may require further surgical intervention which may significantly increase the patient’s length of stay. In a review of patients with deep wound infection following spinal surgery, Canavese et al., (2008) found that deep infection resulted in increased patient morbidity, cost and compromise of spinal alignment.

In an audit of 39 patients following spinal surgery, OPSITE™ Post Operative Visible Surgical Site dressing to reduce wound complications in Paediatric Spinal Surgery

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Number of patients</th>
<th>Number of superficial infections</th>
<th>Number of deep infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2010 - March 2011</td>
<td>171</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>April 2011 - February 2012</td>
<td>93</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>June 2013 - October 2013</td>
<td>39</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 1: This patient had posterior spinal surgery and PICO was used for 7 days post operatively

Figure 2: Image showing the patients wound after 7 days of PICO therapy

Conclusions

The risks of wound complications in spinal surgery are small yet the impact of infection can significantly affect patient morbidity and can be costly for the service. This study is ongoing and therefore conclusions cannot be drawn from this small number of patients. One further cohort of patients have been recruited further comparative data will be published.

Reference


This poster was supported by an unrestricted grant from Smith & Nephew.

Ramesh Nadarajah; Consultant Spinal Surgeon, Great Ormond Street Hospital, Great Ormond St, London WC1N 3JH T: 020 7405 9200 E: Ramesh.nadarajah@gosh.nhs.uk


Edel Broomfield; Clinical Nurse Specialist, Spinal Surgery, Great Ormond Street Hospital, Great Ormond St, London WC1N 3JH T: 020 7405 9200 E: Edel.Broomfield@gosh.nhs.uk

Tom Ember: Consultant Spinal Surgeon, Great Ormond Street Hospital, Great Ormond St, London WC1N 3JH T: 020 7405 9200 E: Tom.Ember@emember0171@id.com

This poster was presented at Wounds UK, Harrogate November 2013

43761

Trademark of Smith & Nephew © Smith & Nephew October 2013