The use of PICO® in the management of a complex dehisced abdominal wound

Background

Mr H is a male in his mid-fifties undergoing an elective surgical repair of an incisional hernia with a mesh graft. Subsequently he presented as an emergency to the surgical assessment unit with sepsis and subsequently required a laparotomy, Hartmann’s procedure and small bowel resection for multiple perforations of the small bowel. A temporary colostomy was created and situated in the lower quadrant of the left side of the patient’s abdomen. Two days after the emergency procedure he was taken back into theatre for a review laparotomy and was sutured internally, with the suprapubic layers being left open.

Initial Management

The initial management objectives were to reduce intra-abdominal pressure and interstitial oedema, effectively manage exudate wound and create the conditions necessary to facilitate wound healing. Negative Pressure Wound Therapy (NPWT) was initiated using black foam and continuous pressures of -80mmHg using the RENASYS® system.

Management Challenges

Although treatment with NPWT proved relatively effective this management approach proved to be suboptimal and a number of management issues remained unresolved (see Figure 1). The close proximity of the stoma site to the wound meant that the NPWT dressing was often disturbed during stoma bag changes. This frequently resulted in the loss of the NPWT dressing seal meaning that the therapeutic benefit of NPWT was inconsistently delivered. It also necessitated the dressing either being patched or changed on a more regular basis than desired, an inconvenience to both the patient and treating clinicians. The need to replace the dressing on a frequent basis was a particular problem since Mr H was experiencing considerable pain at each dressing change.

An additional challenge was posed by the fact that the patient was distressed and frustrated by the limitations his illness had imposed. Mr H had been due to get married however his readmission to hospital during the acute episode of illness meant that this had been postponed. He was therefore understandably extremely anxious to be discharged from hospital and regain his normal life as soon as possible. Although discharge with the current NPWT system in situ and continuation of the dressing regimen in the community was considered, funding issues around the use of NPWT within the PCT made this unlikely. Given the history of commissioning challenges surrounding the discharge of patients into the community with NPWT, delayed discharge seemed inevitable.

Results

Table 1: Patient pain levels and analgesia during course of NPWT treatment

<table>
<thead>
<tr>
<th>Date</th>
<th>Pain 0-10</th>
<th>Morphine</th>
<th>blooms</th>
<th>Morphine</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.6.11</td>
<td>9</td>
<td>£549.50</td>
<td>£54.00</td>
<td>£360.00</td>
<td>£120.00</td>
</tr>
</tbody>
</table>

Day 9

Following eight days of therapy with the PICO system the wound dimensions had reduced considerably and now measured 215mm by 49mm at 20mm. At this point epithelisation could be observed at the wound margins and the reduction in the extent of wound depth was such that the gauze filler was no longer required.

Day 15

On the fifteenth day of therapy with PICO significant wound contracture was observed in addition to further epithelial advancement at the wound margins. The wound dimensions had decreased still further from those with presentation at wound now measuring 200mm x 23mm x 10mm.

In light of the progress the wound had made thus far with the use of PICO therapy it was decided to continue therapy for a further seven days.

Day 22

At this point thirty-five days had elapsed since the emergency procedure had been performed. The decision was made at this time to discontinue PICO therapy as all the treatment objectives had been achieved. The wound dimensions now measured 180mm x 21mm x 10mm and NPWT was no longer required as the wound could be managed perfectly adequately using conventional advanced wound dressings.

The changes in wound dimensions during the course of PICO therapy are summarised in Table 1 below.

Table 1: Changes in wound dimensions with PICO treatment

<table>
<thead>
<tr>
<th>Date</th>
<th>Wound area</th>
<th>Wound volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.6.11</td>
<td>2500 mm²</td>
<td>3920 mm³</td>
</tr>
<tr>
<td>15.7.11</td>
<td>1450 mm²</td>
<td>1920 mm³</td>
</tr>
<tr>
<td>22.7.11</td>
<td>1110 mm²</td>
<td>1470 mm³</td>
</tr>
</tbody>
</table>

Day 15 of therapy with PICO proved highly effective in this case. The unique nature of PICO enabled it to be used on a complex wound with a dehisced and draining to the wound’s close proximity to the patient’s stoma. The use of the simplified lower unit cost PICO system facilitated the early discharge of the patient from hospital and modelled it possible for the patient to engage more fully in his management. This resulted in considerable patient-centred benefits and substantial economic benefits.

Discussion

Patient Experience

The fact that PICO could successfully be utilised in this case facilitated the early discharge of the patient who would otherwise have remained an inpatient for a protracted period of time. Whilst the early discharge created if the patient has considerable economic benefits, the patient-centred benefits associated with this approach must not be overlooked. In this instance early discharge was of considerable benefit to the patient who was keen to get back to his normal life as possible following his surgery. Within his own home the patient was able to eat small meals throughout the day and when his appetite required rather than at regimented times as was the case when he was an in-patient. He was also able to get back into the routine of daily living, having adapted to both the wound and stoma, something that would have been impossible had he remained in hospital. The portability of the PICO device coupled with the patient’s confidence that the dressing would remain securely in place allowed him to resume gentle exercise around his garden, a further step on the road toward a resumption of a normal life.

The fact that PICO was so simple to apply was also a key benefit since this simplicity of use enabled the patient to engage effectively with his own care so that he was able to re-seal his PICO dressing with the sealing strips provided whenever the seal was lost during stoma bag changes. It is possible that this enhanced engagement contributed to positive outcomes seen with PICO such as the dramatic reduction in the level of pain experienced by the patient at dressing change (see Table 1).

Following his discharge the patient has re-arranged his wedding for later this year and a reversal of the temporary colostomy is due to take place within the next three months.

Wound Dimensions

Analysis of the changes to the wound dimensions over the course of PICO treatment was performed. Wound area and volume calculations employed formulae assuming an ellipsoid wound shape. The results show that during PICO treatment the wound area was reduced by 32% at Day 17 and Day 22 of therapy respectively (see Table 2). An even greater reduction in wound volume of 55% and 96% was seen at the same time points (see Table 2).

Cost Analysis

Costs for this case were calculated by applying appropriate unit costs (see Table 3) to the use of resources (see Table 4). These were compared with the theoretical costs associated with a conventional management approach based upon the use of carboxy-based NPWT within secondary care.

The analysis shows the material costs are reduced considerably by the use of PICO (40%). However a major advantage of PICO in this instance is the reduction in the length of in-patient stay. This results in a dramatic reduction in the overall cost of treatment (86%).

Conclusion

The use of PICO proved highly effective in this case. The unique nature of PICO enabled it to be used on a complex wound with a dehisced and draining to the wound’s close proximity to the patient’s stoma. The use of the simplified lower unit cost PICO system facilitated the early discharge of the patient from hospital and modelled it possible for the patient to engage more fully in his management. This resulted in considerable patient-centred benefits and substantial economic benefits.

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References

4. Costs - Unit costs of health and social care. CDSER University of Kent, 2011.

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