A prospective clinical audit of patient dressing choice for post-op arthroscopy wounds

Mayukh Bhattacharyya, Helen Bradley, Sian Holder, Bruno Gerber

Abstract

Background: There is a paucity of data in the published literature as to the true incidence of tape blistering and its association with the use of a particular type of dressing or surgical procedure.

Objective: This clinical audit was conducted to record the true level of skin blistering in patients undergoing arthroscopy of the knee. A secondary objective was to investigate the level of patient satisfaction with the dressing used.

Method: The audit was conducted over a 14-month period. Patients were sequentially allocated to management with either OpSite Post-Op or Mepore dressings.

Results: Blisters developed in 6% of patients managed with Mepore dressings, but were not recorded in the OpSite Post-Op group. Significantly more patients managed with the Mepore dressing developed superficial inflammation of the wound site (p<0.001). Patient satisfaction was higher in the OpSite Post-Op group with 86% of patients able to bathe.

Conclusion: The results confirm the findings of other investigators that choice of dressing may be an important factor in influencing post-operative outcome in otherwise uncomplicated surgery.

Declaration of interest: None

Key Words

OpSite Post-Op, Mepore, Dressing, Arthroscopy, Wound blisters

Minimally invasive surgery (MIS) has the potential to minimise surgical trauma, pain, and recovery time in many surgical and orthopaedic procedures. Arthroscopy offers advantages over traditional open surgery, to patient and healthcare provider alike, in that procedures are generally less invasive. This results in smaller wounds, increased rates of recovery, reductions in hospitalisation episodes and, therefore, reductions in patient intervention costs (Banta, 1993). Arthroscopy of the knee is a common surgical procedure.


Blistering

One potential complication post-operatively is blistering (Cosker et al, 2005). A tape blister is a skin excoriation that occurs under the taped portion of surgical bandages, and can be a source of postoperative morbidity. Tape blisters are caused by the separation of the epidermis from the dermis at the dermal-epidermal junction (Cuzzell, 1990). Tape resistant to stretching contributes to blister formation because of the concentration of forces at the ends of the tape. Tape blisters can be one of the causes of postoperative complications, including wound infection and prolonged length of hospital stay (Hahn et al, 1999). It has been suggested that the creation of shear forces at the dermal-epidermal junction, in association with a decreased blood supply in the dermis, is one of the contributing factors to the development of post-operative blisters (Cuzzell, 1990). To reduce the risk of blistering, care should be taken when selecting the appropriate post-operative dressing.

Although tape blisters are a pervasive clinical problem, their incidence after orthopaedic surgery has rarely been reported in the literature. A recently published audit of blistering after hip surgery reported the incidence of tape-related injuries as 21.4% (Polatsch et al, 2004). Jester et al reported the incidence of blistering as 13% in a quasi-experimental study using a variety of dressings (Jester et al, 2000). In a prospective study of patients undergoing hip or knee surgery, the post-operative blistering rate ranged from 6% to 24% depending on the
dressing used (Cosker et al, 2005). It is clear from this study that the choice of dressing may have a major impact on the rates of blistering in patients undergoing orthopaedic procedures.

**Objectives**

The objectives of this study were to investigate whether choice of dressing influenced either the incidence of post-operative blistering or patient satisfaction and subjective sense of comfort.

**Method**

A clinical audit of patients undergoing arthroscopic knee surgery between December 2002 and February 2004 was conducted in the Department of Orthopaedic Surgery at Lewisham University Hospital. Only patients without any significant co-morbidity who had undergone knee arthroscopy with an intra-articular procedure were included in the analysis. Table 1 lists the inclusion and exclusion criteria.

A sample of 116 patients was allocated sequentially to post-operative management with either OpSite Post-Op®, 5 x 6.5 cm (Smith and Nephew, Hull, UK) or Mepore®, 6 x 7 cm (Mölnlycke Healthcare, Göteborg, Sweden). The study was limited to procedures performed by two orthopaedic surgeons (MB and BG) to control the variable of surgical technique.

All patients had the same type of anaesthesia and aqueous-based iodine as skin preparation. On completion of surgery, a single suture consisting of 3/0 non-absorbable material was used to close the arthroscopy portal. The dressing was applied by the operating surgeon along the longitudinal axis without creating any tensile force. A layer of wool and crepe bandage was then applied to the limb.

All patients were treated with the same post-operative protocol. Patients were instructed to remove the superficial wool and bandage after 48 hours and instructed to perform the first dressing change on day three following index surgery. Patients were assessed on day 10 in the outpatient dressing clinic where the dressing and suture material were removed. At this time, patients were also interviewed by HB who completed a short questionnaire (Figure 1) to record their levels of satisfaction with regard to dressing performance.

Final assessment took place at the outpatient visit on week 6 postoperatively when they were seen by MB or BG. At this visit, any clinical signs of blister formation were recorded and, if a blister was confirmed, a photo was taken to provide an objective record of the wound and to measure its size and shape. Any signs of inflammation were also documented at this assessment. Inflammation was defined as the presence of redness around the portal, or pain or discharge from the wound margin. If a local or superficial wound infection was suspected, a wound swab was taken to obtain a microbiological report. Patients were also monitored by haematological test (white blood cell count, C-reactive protein, and erythrocyte sedimentation rate), and were observed during the course of the study for signs of allergic reaction (defined as an erythematous skin rash without pain or inflammation).

**Statistical method**

Data was entered into Microsoft Excel 2000 for analysis. Fisher’s exact test was used to explore the correlation between dressing type and blistering, inflammation or wound infections. The Fisher’s exact test provides a method for comparing the frequency of observations in a small sample size (Campbell and Machin, 1999). The Cochran-Armitage test for trend of binomial proportions across levels of a single factor or covariate and experimental variables was used to analyse the questionnaire. This tests for trend in binomial proportions across levels of a single factor or covariate and is appropriate for a contingency table where one variable has two levels and the other variable is ordinal (Campbell and Machin 1999). Statistical analysis was conducted at the 2-sided 5% significance level.

**Table 1. Inclusion and exclusion criteria**

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age more than 18 and less than 70 years</td>
<td>Patients not willing to participate</td>
</tr>
<tr>
<td>Arthroscopic knee surgery with some intra-articular procedure</td>
<td>Previous knee surgery within 6 months</td>
</tr>
<tr>
<td>Operating time &lt; 1 hour</td>
<td>History of peripheral vascular disease</td>
</tr>
<tr>
<td>Patients with ASA 0 to ASA I</td>
<td>Arthroscopy wound requiring more than one suture</td>
</tr>
<tr>
<td>Non smoker</td>
<td>Skin disease</td>
</tr>
</tbody>
</table>

**Figure 1. Questionnaire used to record patient satisfaction.**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How do you rate this dressing?</td>
<td>Excellent</td>
<td>Good</td>
</tr>
<tr>
<td>Average</td>
<td>poor</td>
<td>Very poor</td>
</tr>
<tr>
<td>2. Have you taken a shower with it?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3. Is it easy to apply or remove?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4. Does it produce any discomfort or skin irritation?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>5. Does it hamper your daily activities?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Results
Of the 269 patients screened, a total of 116 patients were eligible for inclusion in the audit (Table 2). Sixteen patients were excluded from the analysis because of non-compliance with either the dressing regimen or failure to attend a follow-up assessment. Fifty patients in each treatment group were included in the final analysis.

Dressing-related morbidity
There was no statistically significant difference in terms of blistering or wound infection between the two dressing regimens (Table 3). Three (6%) Mepore patients developed a tape blister (p=0.24) and one had a wound infection (p=1.00). Figure 2 illustrates the blistering that was seen in one of the Mepore patients. No OpSite Post-Op patients experienced a tape blister or wound infection. Figure 3 shows OpSite Post-Op in situ post surgery, and Figure 4 shows OpSite Post-Op in place at follow up. Fourteen (28%) Mepore patients had periportal superficial inflammation at the time of suture removal (day 10), and this was significantly greater (p<0.001) than the Opsite Post-Op group where no signs of inflammation were reported. Three Mepore patients had a tape blister and inflammation of the wound.

Table 2
Demographic data

<table>
<thead>
<tr>
<th>Patient group</th>
<th>OpSite Post-Op (n=50/57)</th>
<th>Mepore (n=50/59)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total 116/195</td>
<td>116/195</td>
<td>116/195</td>
</tr>
<tr>
<td>Exclusion due to non-adherence</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Mean age</td>
<td>37.5 (23–50)</td>
<td>36.8 (20–50)</td>
</tr>
<tr>
<td>Sex</td>
<td>F37:M20</td>
<td>F31:M28</td>
</tr>
</tbody>
</table>

Table 3
Associated morbidity by dressing type

<table>
<thead>
<tr>
<th>Morbidity associated with dressing</th>
<th>OpSite Post-Op (n=50)</th>
<th>Mepore (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape blister</td>
<td>0 (0%)</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Inflammation</td>
<td>0 (0%)</td>
<td>14 (28%)</td>
</tr>
<tr>
<td>Wound infection</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

Discussion
In this clinical audit of the performance of two different dressings, arthroscopic knee surgery tape blisters developed only in the patients dressed with Mepore (n=3; 6%), with 14 (28%) patients developing an inflammation in or around the portal.

These results confirm the findings of other studies on the performance of OpSite Post-Op in clinical practice (Wright, 1994; Cosker et al, 2005). Our results also highlight the importance of dressing choice in clinical practice. It is of note that in terms of blistering, the rates reported in the current study are below those reported elsewhere in the literature (Hahn et al, 1999; Jester et al, 2000; Polatsch et al, 2004), but these may reflect differences in surgical technique and the exclusion of patients with peripheral vascular or skin disease.
undertaken to explore the potential

It is recommended that a robust

in blistering and other complications.

Post-Op may be outweighed in terms

higher unit acquisition cost of OpSite

unit (NHS price, October 2004). The

Cost is also an important consideration.

ability to remain in situ during bathing.

to act as a bacterial barrier and the

transparency, ease of removal, ability

described elsewhere (Cosker et

for arthroscopic surgery have been

incidence of infection (Neues and Haas,

waterproof dressings, is important for

shower post-surgery, while wearing

operative dressing which may reduce

provides information about a post-

clinical studies are needed to confirm

the findings of this clinical audit are

confirmed in a clinical trial where patients

incidence of tape blisters, inflammation

and wound infections and had a greater

level of patient satisfaction than Mepore.

Limitations

However, this study is limited by the

design of sequential allocation to

treatment (i.e. the non-randomisation of

patients). Other limitations are the fact that patients were responsible for

initiating their own dressing change at

72 hours, and this may have influenced

the results. It is recommended that

the findings of this clinical audit are

confirmed in a clinical trial where patients

are randomly allocated to a dressing

regimen, and all dressing changes are

conducted by trained

health professionals.

The properties of an ideal dressing

for arthroscopic surgery have been

described elsewhere (Cosker et

al., 2005), and include permeability,

transparency, ease of removal, ability
to act as a bacterial barrier and the

ability to remain in situ during bathing.

Cost is also an important consideration.
The acquisition cost of Mepore (6 x 7

cm) is 10 pence per unit and OpSite

Post-Op (5 x 6.5 cm) 17 pence per

unit (NHS price, October 2004). The

higher unit acquisition cost of OpSite

Post-Op may be outweighed in terms of
cost-effectiveness by the reduction

in blistering and other complications.

It is recommended that a robust
pharmaco-economic evaluation is

undertaken to explore the potential
cost-effectiveness of film dressings used

following knee surgery.

We believe that OpSite Post-Op is

the dressing of choice in arthroscopic

wounds because of its association with a

reduction in dressing-related morbidity.

This association may be especially

important in patients undergoing day-
care surgery, as these wounds are mainly

managed by the patient in the home

setting. Patients in the OpSite Post-Op

group were more satisfied with their
dressing than patients in the Mepore

group. These results show that OpSite

Post-Op may be the dressing of choice

as it allows the patients to bath while

the dressing is in place. In the current

audit, the use of OpSite Post-Op was

associated with a reduction in the

incidence of tape blisters, inflammation

and wound infections and had a greater

level of patient satisfaction than Mepore.

Table 4

Performance of the dressing in terms of patient

satisfaction

<table>
<thead>
<tr>
<th>Patient satisfaction</th>
<th>Opsite Post-Op (n=50)</th>
<th>Mepore (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>0 (0%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Good</td>
<td>5 (10%)</td>
<td>35 (70%)</td>
</tr>
<tr>
<td>Excellent</td>
<td>45 (90%)</td>
<td>13 (26%)</td>
</tr>
</tbody>
</table>

and smokers from the current audit. Had

these patients been included, it would be

expected that rates of blistering would

have been higher than those recorded.

Both dressings were well tolerated and

no allergic reactions were reported

during the course of the audit.

The ability of patients to bathe or

shower post-surgery, while wearing

waterproof dressings, is important for

patients in terms of quality of life. In

addition, other researchers have shown

a weak correlation between patients

who are able to bathe with waterproof
dressings and a reduction in the

incidence of infection (Neues and Haas,

2000). Although this association was not

investigated in the current audit, it may

account for some of the differences in

the performance of the two dressings.

In summary this prospective study

provides information about a post-

operative dressing which may reduce

dressing-related morbidity. As a result

of this audit we have now stopped

using Mepore on surgical wounds

within our unit. We have also made

a recommendation to change to OpSite

Post-Op within the Department of

Orthopaedics at our hospital. Further

clinical studies are needed to confirm

these data. **We suggested examining the impact of these changes within our unit.**

**Acknowledgement**

The authors would like to thank Anne Mellis, Diana Yeoman and Mr Ratan Gore for their support in conducting this study and Katy Jullia for supplying the relevant educational material.

**Summary**

- **Tape blisters can be one of the causes of postoperative complications, including wound infection and prolonged length of hospital stay.**

- **One hundred and sixteen patients were allocated sequentially to postoperative management with either OpSite Post-Op or Mepore dressings.**

- **Arthroscopic knee surgery**

- **taped blisters developed only in the patients dressed with Mepore (n=3, 6%) with 14 (28%) patients developing an inflammation in or around the portal.**

**References**


**Wounds UK**