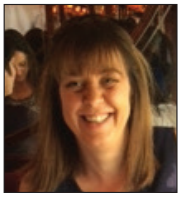
Meeting report: new research and solutions to postoperative wound care challenges



The speakers at the symposium were (clockwise from top left): Karen Ousey, Kourosh Zarghooni and Philippe Van Overschelde

A one-hour symposium entitled 'New research and solutions to postoperative wound care challenges' was held by Mölnlycke Health Care on Thursday 29th September at the fifth congress of the World Union of Wound Healing Societies (WUWHS) in Florence, Italy. The overriding aim of the session was to focus on the challenges of postoperative wound care, i.e. blistering, surgical site infection (SSI), and their associated costs. The importance of clinicians being able to select appropriate dressings was addressed with a discussion surrounding potential benefits associated with the use of a new, advanced postoperative wound dressing.

Karen Ousey *is Professor of Skin Integrity at the Institute of Skin Integrity and Infection Prevention, University of Huddersfield, UK*

Kourosh Zarghooni *is Senior Attending Surgeon, Department of Orthopaedics and Trauma Surgery, University Hospital of Cologne, Germany*

Philippe Van Overschelde *is Hip and Knee Surgeon, AZ Maria Middelares, Ghent, Belgium*

Epidemiology of surgical site infections

Chair Professor Karen Ousey began the session by explaining that postoperative wound care presents various challenges to clinicians, with surgical site infection (SSI) being a key problem encountered. Indeed, in 2002, the estimated incidence rate of healthcare-associated infections (HCAIs) related to postoperative infection in the USA was 4.5%, corresponding to 9.3 infections per 1,000 patient-days or 1.7 million affected patients[1], while a European Union (EU) audit of HCAIs in 2013 showed a 5.7% overall point prevalence rate[2]. The significance of this is manifest when it is considered that more than 230 million surgical procedures per annum take place globally[3].

Cost of surgical site infections

SSIs are the second most common (19.6%) type of HCAI in Europe[2]. The cost of SSI has been explored in the literature; Jenks et al (2014)[4] undertook a two-year study between April 2010 and March 2012 to ascertain the clinical and economic burden of SSIs, as well as to predict the financial consequences of their elimination. The median additional length of stay (LOS) attributable to SSI for all surgical categories over the two-year period was found to be 10 days (95% CI: 7–13 days), equating to a total of 4,694 lost bed-days. The median postoperative LOS of patients who developed a superficial or deep or organ space SSI was significantly increased to 17 days (95% CI: 13–18 days) and 24 days (95% CI: 21–29 days) respectively. The associated costs of a patient developing an SSI for all surgical categories over the two-year period was £4,622–£6,719 (median £5,239), with the aggregate extra cost over the study period standing at £2,491,424.

Blistering

The development of blisters around the periwound area has been identified as a potential risk factor for SSI. Blisters are a disruption to the skin's integrity and may enable ingress of bacteria and increase the risk of infection, especially if the blister membrane (epidermis) is ruptured[5].

Professor Ousey explained that there is a statistically significant correlation between dressing type used and the rate of blistering[6]. Postoperative wound dressings that allow for a warm, moist wound healing environment, protect the periwound area and which do not adhere to the surrounding skin, leading to pain-free dressing removal, are likely to reduce the rates of postoperative blistering.

Dressing selection

During the symposium, Professor Ousey noted the importance of optimal wound dressing selection for the patient and discussed the necessity for clinicians to possess the knowledge and skills to be able to correctly apply and remove wound dressings. It was highlighted that dressings should be chosen following an in-depth assessment of the wound bed, while ensuring that they are cost-effective. Cost-effectiveness should be considered

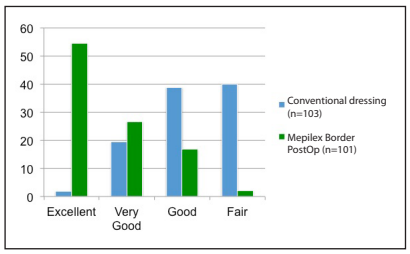


Figure 1. Patient rating for comfort of dressing.

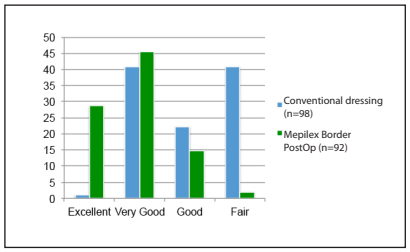


Figure 2. Nurse rating for application of dressing.

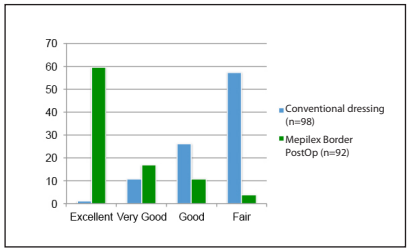


Figure 3. Nurse rating for removal of dressing.

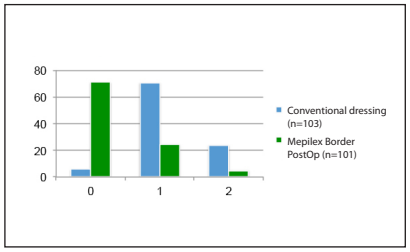


Figure 4. Number of dressing changes per patient.

in terms of the length of time that the dressing can be left in situ, availability of the dressing across primary and secondary care, and comfort for the patient, in addition to unit price of the dressing.

Dressing choice is an important aspect of the wound treatment process. Dressings perform numerous functions: managing exudate, promoting a moist, warm environment, protecting periwound skin, forming an effective barrier to bacterial infection and preventing blistering. Dressings should protect the wound and not cause further damage. Sanusi (2011)[7] warned that incorrect application of wound dressings can have a detrimental impact on skin architecture. The ideal postoperative dressing should also be comfortable, conformable, easy to apply, provide a waterproof barrier and allow for atraumatic removal.

A prospective comparative study

The second speaker, Dr Kourosh Zarghooni presented the results of a clinical investigation into the performance of postoperative wound dressings following primary knee and hip arthroplasty.

The study was undertaken to evaluate the performance of a modern postoperative wound dressing (Mepilex® Border Post-Op) compared to a range of conventional wound dressings (standard care) for patients who had undergone primary knee and hip arthroplasty[8]. Dr Zarghooni et al's clinical investigation began with a 2-week observation phase of conventional wound dressings, followed by an intervention phase, where patients were treated with Mepilex Border Post-Op dressings.

Dr Zarghooni explained that blistering poses various problems to patients, including increased discomfort and pain, delayed surgical wound healing and increased risk of SSI. Furthermore, frequent dressing changes can have a negative effect in terms of postoperative wound complications[8].

The primary objective of the study was to evaluate the occurrence of blisters. The impact of the Mepilex Border Post-Op dressing on the patient, the dressing's ability to minimise the risk of maceration, the frequency of dressing changes, and treatment costs were also evaluated. There was no blistering in any of the patients in the Mepilex group (n = 49), whereas blistering occurred in 27.3% (n = 3) of patients in the conventional group (n = 11, $p < 0.01$).

The results of the study suggested that the number of dressing changes could be significantly reduced with the use of the Mepilex Border Post-Op dressing when compared to conventional dressings.

Those patients treated with conventional dressings had an average total of 2 dressing changes (standard deviation [SD] ± 0.77), while the group using Mepilex Border Post-Op had an average total of 0.66 (SD ± 1.27). In terms of material and personnel costs, treatment with Mepilex Border Post-Op amounted to EUR28.00 (SD ± 11.4) — (EUR25.10 (SD ± 10.2) and 2.93 (SD ± 1.97) respectively) per patient — while the cost associated with the conventional dressings was EUR43.10 (SD ± 19.4) — material costs of EUR34.30 (SD ±17.7) and personnel costs of EUR8.87 (SD ±3.52). The lower costs encountered with the use of Mepilex Border Post-Op were attributed to the reduction in dressing changes required (cost of the dressings and time spent undertaking dressing changes, inclusive of nursing time).

A randomised controlled trial

Doctor Zarghooni presented data from a second, unpublished study[9], where the primary objective was to minimise the risk of blister development and the secondary objectives were to evaluate the comfort, conformability, performance and acceptability of the wound dressing.

In this study, the sample of 209 participants were randomly allocated to one of two groups — one group (n=106) was allocated to Cosmopor® E (Hartmann) and the other to Mepilex Border Post-Op (n=103). The average age of the Cosmopor group was 66.2 years and 66.8 years for the Mepilex Border Post-Op group; 55.2% were male in the former group and 47.6% in the latter, with a relatively equal amount of patients that had undergone hip surgery, knee surgery and spine surgery in both groups.

There was no evidence of blistering in either the observation or the intervention groups. Mepilex Border Post-Op was tolerated very well by the patients and clinical staff reported that they were satisfied with the ease of application and removal of Mepilex Border Post-Op *[Figures 1–3]*. As in the first study, Mepilex Border Post-Op required fewer dressing changes *[Figure 4]* and, as such, was shown to be a cost-effective alternative to the conventional dressing. It was also suggested that the reduced frequency of dressing changes may have helped to minimise the risk of wound infection due to reduced exposure to bacteria.

On the basis of the results of this study, Dr Zarghooni recommended the use of Mepilex Border Post-Op dressings on patients who have undergone primary hip and knee arthroplasties or spinal surgery.

Comparing two wound dressings used after elective hip and knee arthroplasty

The final presentation of the symposium was delivered by Dr Philippe Van Overschelde. He supported the first two speakers and agreed that patients who undergo hip and knee replacements are at risk of developing postoperative wound complications, including blistering and SSI. Furthermore, Germany, Austria, Sweden, Finland and Belgium had the highest rates of hip and knee replacements among EU countries during 2012[10].

Dr Van Overschelde suggested that the management of surgical incision sites should focus on three key areas: minimising disturbance to the wound, preventing microbial invasion and maintaining patient comfort. With these factors in mind, Dr Van Overschelde reported on a study that was undertaken with the primary objective of evaluating if complications related to surgical wounds were more common in the treatment group (Mepilex Border Post-Op) compared to the control group (Aquacel® Surgical, ConvaTec). Secondary objectives included: the evaluation of the dressing's performance; evaluation of the comfort, conformability and acceptability of the dressing; and assessment of pain level before and during dressing removal at the last patient visit.

The multicentre randomised controlled trial involved 103 participants in the intention-to-treat (ITT) population who were undergoing elective primary hip or knee arthroplasty with an anticipated hospital stay of four or more postoperative days with a planned incision size ≤18cm. There were 53 participants in the Mepilex Border Post-Op group and 50 participants in the Aquacel Surgical group (ITT population). The primary outcome measure was dressing failure, measured via a score ranging from 0–7 — dressing change had a score of 3, blister occurrence had a score of 2, pain ≥30mm (measured on a 100mm visual analogue scale [VAS]) at last visit had a score of 1, and redness on the skin under the dressing had a score of 1. Dressing failure was defined as: one or more dressing change, blister, pain at removal ≥30mm, redness on the skin under the dressing (as per the scoring system).

Secondary outcomes included the number of dressing changes, redness of the skin under the dressing from operation to the last hospital visit, blister occurrence from operation to last hospital visit and whether any skin tear occurred from operation day to last hospital visit, according to the Skin Tear Classification System[11]. Others included:

- Surgical wounds free from complications
- Dressing adherence to the staples/sutures
- Itching under the dressing and patient satisfaction with the dressing
- Clinician satisfaction
- Patient mobility
- Presence of local/systemic infection
- Pain level before and during removal of dressings
- Dressing capacity of handling blood
- Residual of dressing material in the wound and/or surrounding skin.

The average age (years) of the Mepilex Border Post-Op group was 69.2 and 68.5 in the control group. There were 36 females in the former group (67.9%) and 27 females in the control group (54.0%). In the Mepilex Border Post-Op group, 26 patients (49.1%) had undergone hip surgery, while 27 patients (50.9%) had undergone knee surgery. In the control group, 25 patients (50%) had undergone hip surgery and 25 patients (50%) had undergone knee surgery.

There was no significant difference between the two groups in terms of dressing failure. However, it is likely that a larger population would be needed to highlight any differences. There was little difference between the two groups in relation to the number of dressing changes with 86.8% (n=46) requiring no dressing change in the Mepilex Border Post-Op group compared to 90.0% (n=45) in the control group. The most common reason for dressing change was saturation of the dressing.

In terms of ease of application of the dressings at visit 2 (day of surgery), 70% of clinicians said that the control dressing was 'good' in this regard and 24% deemed it 'very good', whereas Mepilex Border Post-Op outperformed this, with 32.1% finding the dressing 'very good' and 41.5% 'excellent' (the top score on this scale), compared to just 2% who found the control dressing 'excellent'. Mepilex Border Post-Op also outperformed the comparator dressing

in terms of ease of removal of the dressings at the final visit, with 61.5% finding this 'excellent' with Mepilex Border Post-Op, compared to 4.0% with the control.

The dressings performed similarly when assessing redness of the skin under the dressing, with 81.1% (n=43) and 76.0% (n=38) displaying no redness when using Mepilex Border Post-Op and the control respectively. However, subject evaluation of satisfaction associated with the wearing of the dressing during rehabilitation training at the final visit saw 34.0% of the Mepilex Border Post-Op group reporting this as 'excellent', compared to 14.0% in the control group. Also, in terms of the overall experience of using the dressing, 30.2% rated Mepilex Border Post-Op 'excellent' and 8.0% expressed the same rating for the control at the final visit.

In conclusion, Mepilex Border Post-Op was shown to outperform the control dressing across five key areas: pain level, no residuals from the dressing (Mepilex Border Post-Op had 100% success compared to 87.0% with the control), dressing absorption (capacity of blood), ease of application and patient satisfaction of wearing the dressing.

With patient comfort and mobility as key facets of Mepilex Border Post-Op, the dressing was found to enable patient movement, while minimising the number of dressing changes. As a result, postoperative wounds were afforded the chance to heal undisturbed, while cost efficiency was maximised.

Conclusion

The symposium attracted over 90 delegates who were able to listen to speakers presenting research surrounding postoperative wound care. The delegates asked a range of questions and were able to share their experiences. The three speakers agreed that dressing selection is a vital aspect of effectively managing postoperative wounds, in order to limit or eliminate patient pain and discomfort, manage exudate, protect the periwound skin and avoid wound blistering. They also identified and stressed the importance of clinicians being experts in applying and removing wound dressings so as not to damage skin or create excessive pain and discomfort for patients. During the symposium, data were presented that demonstrates the importance of using the correct dressing to manage postoperative wounds effectively.

The three studies presented during the symposium demonstrated that Mepilex Border Post-Op is effective in managing postoperative wounds, protecting the periwound area, managing exudate, preventing blister formation and also in terms of cost-effectiveness, at a time when clinicians need to ensure that the most cost-effective wound dressing is chosen, while not compromising quality of care. WINT

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References

1. Klevens RM, Edwards JR, Richards CL et al. Estimating health care-associated infections and deaths in US hospitals, 2002. *Public Health Reports* 2007; 122(2): 160–6
2. European Centre for Disease Prevention and Control. Surveillance Report: Point Prevalence Survey of Healthcare-associated Infections and Antimicrobial Use in European Hospitals 2011-2012. ECDPC, Stockholm, 2013. Available at: http://bit.ly/2jq9Q0H (accessed 31.01.2017)
3. Weiser TG, Regenbogen SE, Thompson KD et al. An estimation of the global volume of surgery: a modelling strategy based on available data. *Lancet* 2008; 372(9633): 139–44
4. Jenks PJ, Laurent M, McQuarry S, Watkins R. Clinical and economic burden of surgical site infection (SSI) and predicted financial consequences of elimination of SSI from an English hospital. *J Hosp Infect* 2014; 86(1): 24–33
5. Leal A, Kirby P. Blister formation on primary wound closure sites: a comparison of two dressings. *Wounds UK* 2008; 4(2): 31–7
6. Ousey K, Gillibrand W G, Stephenson J. Understanding and preventing wound blistering. *Wounds UK* 2011; 7(4): 50–6
7. Sanusi AL. Severe wound traction-blisters after inadequate dressing application following laparoscopic cholecystectomy: case report of a preventable complication. *Patient Safety in Surgery* 2011; 5:4 doi:10.1186/1754-9493-5-4
8. Zarghooni K, Bredow J, Siewe J et al. Is the use of modern versus conventional wound dressings warranted after primary knee and hip arthroplasty? Results of a Prospective Comparative Study. *Acta Orthop Belg* 2015; 81(4): 768-75
9. Bredow J, Oppermann J, Hoffmann K et al. Clinical trial to evaluate the performance of a flexible self-adherent absorbent dressing coated with a soft silicone layer compared to a standard wound dressing after orthopedic or spinal surgery: study protocol for a randomized controlled trial. *Trials* 2015; 16: 81
10. Organisation for Economic Co-operation and Development. Health at a Glance: Europe 2014, *OECD Publishing* 2014; Available at: http://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-europe-2014_health_glance_eur-2014-en (accessed 14.10.2016)
11. Carville K, Lewin G, Newall N et al. STAR: A consensus for skin tear classification. *Primary Intention* 2007; 15(1): 8–25