

3M™ Ioban™ 2 Antimicrobial Incise Drapes
Clinical Review



Supporting
professionals
to reduce SSIs

3M Infection Prevention Solutions

Innovation
On A Mission



3M™ Ioban™ 2 Antimicrobial Incise Drapes Clinical Review

Why is it important to reduce the risk of Surgical Site Infections (SSIs)?

Surgical site infections are the most common nosocomial infections in surgical patients. They lead to increased morbidity and mortality and, on average, double the cost of medical care. Therefore, prevention has become paramount.¹

Many SSIs are unaccounted for as the majority (up to 60%) are superficial and present in the community.²

SSIs are estimated to affect at least 5% of patients undergoing a surgical procedure in England and Wales.³ This figure may be grossly underestimated due to lack of hospital surveillance.⁴

“The financial burden of SSIs to the NHS is approximately £758 million per year and cost per SSI approximately £2100”.⁵ With greater surveillance this figure could be much higher and the impact on the patient’s experience and recovery is also a key reason to use interventions which will reduce the risk of SSIs during surgical procedures.

Why is it important to use a skin prep and an antimicrobial incise drape to reduce the risk of a Surgical Site Infection?

The skin constitutes a major source of the organisms responsible for wound infection; for this reason, the resulting prolonged suppression of skin flora might be associated with a reduction in postoperative wound infection.⁶

“An Ioban drape is an essential part of a Surgeon’s care bundle to reduce the risk of SSIs and creates a sterile field not achievable by skin preparation alone. Following skin preparation the Ioban drape ensures the surgical site is sealed and as the skin sweats the drape stays in place and the active agent keeps working.”

Mr Philip Roberts, Consultant Orthopaedic Surgeon, University Hospital of North Staffordshire, January 2012.

In this review two recent clinical papers **1** and **2** are summarised to show the effectiveness of different skin asepsis solutions, chlorhexidine and povidone-iodine. In the papers the benefits of using both synergistically are discussed.

The final three clinical papers **3**, **4** and **5** are summaries of recent evidence to support the use of Ioban incise drapes in reducing the risk of SSIs.



Evaluation of the skin flora after chlorhexidine and povidone-iodine preparation in neurosurgical practice by Aslan Guzel, MD, Tuncer Ozekinci, MD, Umit Ozkan, MD, Yusuf Celik, PhD, Adnan Ceviz, MD, Deniz Belen, MD. Received 25th September 2007; accepted 16th October 2007. *Surgical Neurology* 71 (2009) 207-210.

Background

There are various antiseptics used for cleaning the skin before surgery, but there is no standard procedure in practice. Chlorhexidine and povidone-iodine are the most preferred compounds among antiseptics. Both are proved to be safe and effective for skin disinfection. In this study, the aim was to investigate the combined effects of chlorhexidine and povidone-iodine on the skin's flora before neurosurgical intervention, consecutively.

Key Findings

- Using a combination of chlorhexidine with povidone-iodine is safe and effective for skin antiseptics. Preoperative scrubbing of the surgical skin area with chlorhexidine for three minutes, followed by cleaning once with povidone-iodine, could be sufficient to reduce skin bacterial flora before neurosurgical intervention. This practice may provide a standard skin disinfection method in neurosurgical procedures.
- Chlorhexidine and povidone-iodine are useful agents for skin disinfection separately before surgery. Chlorhexidine is a safe and effective antiseptic as a skin disinfectant, and it is more effective than povidone-iodine in diminishing skin colonisation with staphylococci in patients before operation.
- Povidone-iodine has also bactericidal activity against a wide spectrum of pathogens, including methicillin-resistant *Staphylococcus aureus*. No adverse effects such as skin reaction or allergy and postoperative infection were observed in any patients in the presented study.
- Although many researchers agree that chlorhexidine and povidone-iodine are effective antiseptics, there is no certain duration of application for the antiseptic effect.

3M's Recommendation

3M™ Ioban™ 2 Antimicrobial Incise Drapes should be used following surgical skin asepsis using povidone-iodine or chlorhexidine. Ioban antimicrobial incise drapes contain iodophor which reduces skin recolonisation throughout the procedure.⁷

Efficacy of concurrent application of chlorhexidine gluconate and povidone iodine against six nosocomial pathogens by Michele J. Anderson, PhD, Mary E. Horn, BS, Ying-Chi Lin, PhD, Patrick J. Parkes, MD, PhD and Marnie L. Peterson, PharmD, PhD. *American Journal of Infection Control* December 2010 Vol. 38 No. 10, 826-831

Background

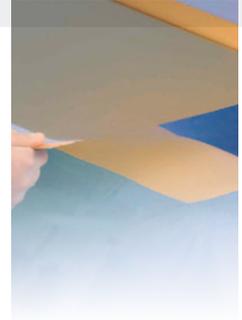
Chlorhexidine gluconate (CHG) and povidone iodine (PI) are rarely used concurrently despite a lack of evidence regarding functional incompatibility of these agents. Many studies have compared the individual antiseptic activity of these two compounds, but few studies have evaluated the activity of the compounds in combination. This study examined the antimicrobial effects of an aqueous solution containing both CHG and PI.

Key Findings

- CHG and PI have different cellular targets and different mechanisms of action. These differences may prove beneficial when using these two antiseptics in combination. CHG damages the outer membrane, which, in turn, would augment access to the intracellular targets necessary for the bactericidal action of PI. Moreover, PI's activity is more immediate, whereas CHG's activity occurs later and lingers, implying that these two compounds may work cooperatively.
- Fractional bactericidal concentration index (FBCI), determined in broth culture, indicate that combining CHG and PI had no negative impact on antiseptics. Moreover, data from an ex vivo porcine mucosal infection model suggests a potential benefit when combining both antiseptic agents.
- PI has rapid bactericidal activity, but activity is diminished shortly after contact with organic matter present in skin. CHG is not as fast acting but exhibits sustained antimicrobial activity and is not readily neutralized by organic matter.
- The study surmised that these two agents would compliment one another by creating an initial and rapid kill of resident flora, followed by a sustained antibacterial effect, which could prove quite beneficial in the clinical setting.
- The results from checkerboard microdilution assays performed using the six nosocomial organisms indicate that there is no functional incompatibility when combining CHG and PI.
- The ex vivo full-thickness mucosal model of infection suggests that there may be a benefit to combining the two antiseptic agents against methicillin-sensitive *Staphylococcus aureus* (MSSA).
- Together this data and recent reports suggest that there may be clinical benefits to using a combination of these agents to prepare skin prior to surgery.

3M's Recommendation

3M™ Ioban™ 2 Antimicrobial Incise Drapes can be used following surgical skin asepsis with PI or CHG. Ioban incise drapes contain iodophor for sustained antimicrobial activity, this reduces skin recolonisation throughout the procedure.⁷



Recent Clinical Evidence - Supporting the use of 3M™ Ioban™ Antimicrobial Incise Drapes

Prevention of postoperative wound infections by covering the surgical field with iodine-impregnated incision drape (Ioban 2) by Axel Kramer, Ojan Assadian and Jurgen Lademann. *GMS Krankenhaushygiene Interdisziplinär* 2010, Vol. 5(2) 1-8

Background

A literature review on the efficacy of iodine-impregnated incision drapes was conducted in order to assess their value in the prevention of surgical site infections (SSIs). This analysis shows the significance of the use of iodine impregnated incision drapes (Ioban 2 incise drapes) for the prevention of postoperative wound infections.

Key Findings

- The Ioban incise drape has a microbicidal effect in vitro, consequently an antiseptic effect also occurs under the incision drape when it is applied to the skin; at the same time, bacterial wound contamination is reduced. A meta analysis which evaluated four prospective studies and one retrospective study was able to provide significant confirmation of a reduction in the SSI rate. There are no limitations in terms of the biocompatibility of the iodine impregnated incision drape (Ioban).
- In addition to skin antiseptics, the use of antimicrobial impregnated incision drapes (Ioban) can kill pathogens which have migrated up, or suppress their upward movement out of the follicles, and provide options to minimise the potential dangers of this reservoir of pathogens.
- An in vitro study demonstrated that after direct inoculation of different bacteria onto the iodine impregnated incision drape (Ioban) it shows a clinically relevant reduction of the microbial count.
- In a prospective randomised controlled study the use of the antiseptic drape (Ioban) in comparison to standard skin antiseptics without using the drape did reduce wound contamination in abdominal and cardiac surgery; however the SSI rate did not differ significantly. In cardiac surgery, the use of the antiseptic drape (Ioban) also showed only a reduction in the rate of SSIs (6.3% vs. 14.8%).
- After the removal of liver cancers, the influence of the iodine-impregnated drape (Ioban) on the SSI rate was compared to skin antiseptics without using the drape. The SSI rate using the antiseptic drape (Ioban) was 3.1%; without use of the antimicrobial drape, it was 12.1%.
- When comparing the efficacy of skin antiseptics with PVP iodine to the use of the iodine-impregnated drape (Ioban) without preceding skin antiseptics, the skin antiseptics with PVP iodine were more effective than the drape, though the drape also had an antiseptic effect. At the same time, the iodine-impregnated drape reduced wound contamination.



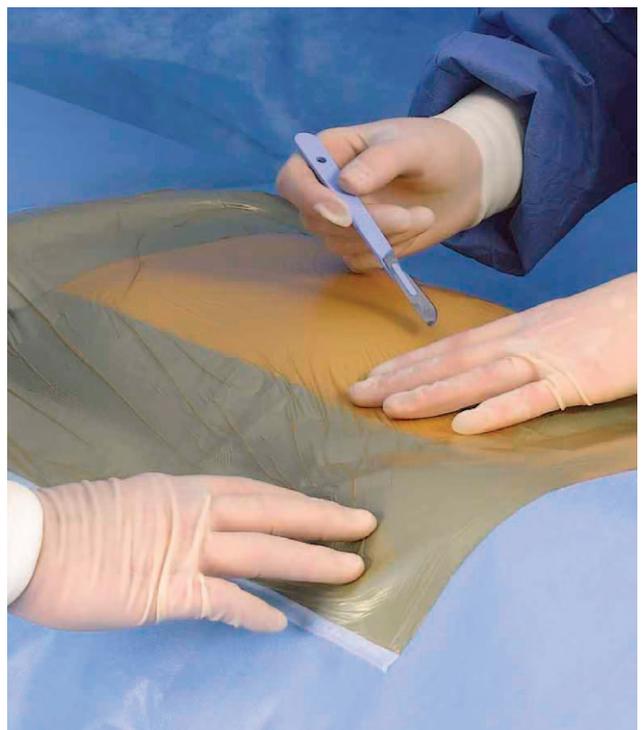
Plastic iodophor drape during liver surgery operative use of the iodophor impregnated adhesive drape to prevent wound infection during high risk surgery by Yasuko Yoshimura, Shoji Kubo, MD, Kazuhiro Hirohashi, MD, Masao Ogawa, MD, Ken Morimoto, MD, Kumiko Shirata, Hiroaki Kinoshita, MD. Published Online May 13th 2003. World Journal of Surgery 2003;27:685-688

Background

The factors associated with wound infection after liver resection was respectively investigated on 296 patients, with special reference to use of a plastic adhesive drape impregnated with iodophor (Ioban). The influence of the iodine-impregnated drape on the SSI rate was compared to skin antiseptics without using the drape for clean-contaminated surgery for removal of liver cancers.

Key Findings

- Wound infections developed in 21 of 174 patients (12.1%) without the drapes and in 4 of 122 patients with the iodophor impregnated drapes (3.1%) ($p = 0.0096$). The iodophor drapes isolated the skin bacteria including *Staphylococcus aureus* and *Staphylococcus epidermidis*.
- A regression analysis showed that low BMI, smoking, long preoperative hospital stays and no use of the iodophor impregnated incise drapes were risk factors for wound infection.
- Plastic adhesive drapes impregnated with iodophor were found useful for preventing wound infection after liver resection for hepatocellular carcinoma (HCC).
- Separation of the iodophor drape from the skin did not occur in any of the patients during the operation, and none of the patients showed evidence of an allergic reaction to iodophor.



An *in vitro* time-kill study to compare the antimicrobial activity of three antimicrobial surgical incise drapes. Chou Eyberg, BS, BS, Ch E, MS, Dan Morse, BS, MS, Linda Olson, BS and Patrick J. Parks, MD, PhD.

Poster presented at the Society of Healthcare Epidemiology of America (SHEA) in March 2009

Background

The objective of this study was to measure the antimicrobial activity of three antimicrobial incise drapes and one non-antimicrobial incise drape using an *in vitro* microbial time-kill method. This controlled, comparative, time-kill study at an independent test laboratory assessed and compared the *in vitro* efficacy of antimicrobial incise drapes using a selected battery of twelve microorganisms commonly associated with surgical site infections at test conditions: 30, 60 and 90 minutes contact.

Key Findings

- The results indicated that using an iodine-based antimicrobial incise drape had more effective antimicrobial results. Efficacy was measured using bacterial density reduction expressed logarithmically ("log kill") over timeframes representative of current surgical practice.
- Of particular note are the results demonstrated in the case of MRSA and MRSE, organisms associated with increased incidence of surgical site infections and morbidity in surgeries commonly using incise drapes. When using loban incise drapes the results were more than 2 log reductions for MRSA, 3.5 log for MRSE after 60 mins and more than 5 logs for both species after 90 minutes.
- While the control drape was ineffective loban 2 ensured a reduction by up to 1 log after 30 min depending on the species.
- After direct inoculation onto the iodine impregnated incision drape it shows a clinically relevant reduction of the microbial count.
- In summary after a 30, 60 and 90 minute timeframe loban incise drapes reduced bacterial counts more compared to the other three incise drapes in the study.



Ordering Information

3M™ Ioban™ 2 Antimicrobial Incise Drapes

3M Cat No.	Product	Overall Size	Adhesive Area	Items/Box	Boxes/Case	Recommended Application
6635	Treatment Incise 	15cm x 20cm	10cm x 20cm	10	4	For small limb surgery i.e. fingers and toes
6640	Small Incise 	44cm x 35cm	34cm x 35cm	10	4	Small limb surgery, ankles, wrists
6650	Medium Incise 	66cm x 45cm	56cm x 45cm	10	4	Hernia repair, paediatrics
6648	Large Incise 	66cm x 60cm	56cm x 60cm	10	4	Knees, shoulders, abdominal procedures
6651	Extra Large Incise 	66cm x 85cm	56cm x 85cm	10	4	Hips, cardiac surgery, major abdominal surgery

3M™ Ioban™ 2 Antimicrobial Incise Drapes EZ

3M Cat No.	Product	Overall Size	Adhesive Area	Items/Box	Boxes/Case	Recommended Application
6661EZ	Frame Delivery 	30cm x 20cm	26cm x 20cm	50	2	Paediatric surgery, ankles, wrists
6640EZ	Small Incise 	60cm x 35cm	35cm x 35cm	10	4	Small limb surgery, ankles, wrists
6650EZ	Medium Incise 	90cm x 45cm	60cm x 45cm	10	4	Hernia repair, paediatrics
6648EZ	Large Incise 	90cm x 60cm	60cm x 60cm	10	4	Knees, shoulders, abdominal procedures
6651EZ	Extra Large Incise 	90cm x 85cm	60cm x 85cm	10	4	Hips, cardiac surgery, major abdominal surgery

3M™ Drapes with Ioban™ 2 Incise Area

3M Cat No.	Product	Overall Size	Incise Area	Items/Box	Boxes/Case	Recommended Application
6665	Abdomino-Perineal Drape	200cm x 270cm	35cm x 46cm	10	1	General Surgery
6677	Cardiovascular Sheet	274cm x 338cm	41cm x 92cm	6	1	Cardiac Surgery
6681	Cardiovascular Drape	320cm x 230cm	-	8	1	Cardiac Surgery
6682	Cardiovascular Drape	330cm x 254cm	78cm x 43cm	8	1	Cardiac Surgery
6697	Caesarean Section Drape	254cm x 291cm	30cm x 30cm	5	1	Obstetrics, Gynaecology
6617	Isolation Drape	320cm x 213cm	48cm x 25cm	5	4	Orthopaedic
6619	Large Isolation Drape	328cm x 252cm	70cm x 32cm	5	1	Orthopaedic
6687	Craniotomy Drape	231cm x 432cm	36.8cm x 21.4cm	10	1	Neurosurgery

Please visit www.3m.co.uk/ioban for more product information, to request samples or arrange a visit from a 3M representative.

References

1. Prof. Dr. Andreas Widmer, Board Member in Internal Medicine and Infectious Diseases Basel, Switzerland, 2011
2. Under the Knife Report, This is an independent report sponsored by Care Fusion, June 2011
3. National Institute for Health and Clinical Excellence. Surgical Site Infection. Clinical Guideline 74. London. October 2008
4. Tanner J, Khan D, Aplin C et al. Post-discharge surveillance to identify colorectal surgical site infection rates and related costs. Journal of Hospital Infection 2009; 72: 243-50
5. Calculating the cost of SSIs by Louise Frampton, Clinical Services Journal, September 2010 Vol 10 Issue 8, page 49-51
6. Mannion P.T, Thom B.T, Reynolds C.S. The acquisition of antibiotic resistant coagulase-negative staphylococci by aortic graft recipients. Journal of Hospital Infection 1989;14:313-23
7. Rate of bacterial recolonization of the skin after preparation: four methods compared D. H. Johnston, J. A. Fairclough, E. M. Brown, and R. Morris. Br. J. Surg. 1987, Vol. 74, January, 64



3M Health Care Limited

3M House
Morley Street
Loughborough
Leicestershire LE11 1EP
Telephone (01509) 611611
Facsimile (01509) 237288

3M Ireland

The Iveagh Building
The Park
Carrickmines
Dublin 18, Ireland
Tel: 00 353 (01) 280 3555
Fax: 00 353 (01) 280 3509

3M and Ioban are trademarks of the 3M Company.
© 3M 2012



IP037L

Licensed by ABHI