Management of complicated sacrococcygeal pilonidal sinus disease

Whiteley I & Keshava A

ABSTRACT

This case study documents the treatment interventions and outcomes of a young man with complex pilonidal sinus (PNS) disease. The healing process fluctuated, with periods of improvement and regression. Various wound care products were introduced with the aim of optimising wound bed preparation and healing. Seven general anaesthetics were required to perform surgical interventions, examine wound progress or to apply topical negative pressure wound therapy. The delayed wound healing caused disappointment and frustration for the patient, his family and the team involved in his care. The challenges were exacerbated as treatment took place during his final year of school, while completing the Higher School Certificate (HSC). No pre-existing medical conditions contributed to the delayed healing. Primary wound closure or flap techniques were not recommended due to infection and proximity to the anus. Complete healing was achieved in 343 days.

Keywords: sacrococcygeal pilonidal sinus disease, chronic wound, wound products, wound therapies, psychological assessment.

INTRODUCTION

Sacrococcygeal pilonidal sinus (PNS) disease describes a hair-filled cavity in the subcutaneous fat of the natal/gluteal cleft. PNS disease often presents clinically as an abscess, or may manifest as a chronic discharging sinus. Young males are affected twice as often as females, with the highest incidence in the second and third decades. The incidence of PNS disease in the general population is 26 cases per 100,000 people[1]. PNS wounds will, in general, heal more rapidly after primary closure than following excision and healing by secondary intention[2,3]. With primary closure, the benefits of off-midline closure compared with midline closure have been demonstrated[2,3] and where surgery is the treatment of choice, off-midline closure should be the standard management[3]. Faster healing times and lower surgical site infections present when an off-midline closure performed[3]. There was no difference in the rate of surgical site infections reported when comparing surgical closure over versus healing by secondary intention; however, recurrence rates were lower with open healing[3]. No consensus currently exists on the optimum treatment for PNS and all therapies have various advantages and disadvantages[4]. No clear benefit was shown for surgical closure over open healing[3] leading to investigation of alternative interventions such as fibrin glue for which evidence remains uncertain[4]. The mean time to healing for open versus surgical closure 65.7:16.6 days[3]. The purpose of this case study was to document the treatment and outcomes of a complex open PNS wound where healing by secondary intention was substantially delayed.

Ian Whiteley*
MClinNurs
Nurse Practitioner — Stomal Therapy
Concord Repatriation General Hospital
Hospital Road, Concord, NSW 2139, Australia
Clinical Senior Lecturer
The University of Sydney, Sydney Nursing School
Email ian.whiteley@sswahs.nsw.gov.au

Anil Keshava
MBBS, MS, FRACS
Clinical Associate Professor
Concord Institute of Academic Surgery
Concord Clinical School
University of Sydney, Hospital Road
Concord, NSW 2139, Australia
Email anilkeshava@gmail.com

** Corresponding author*

BACKGROUND

The patient was a 17-year-old male who turned 18 during treatment. A chronic PNS was evident when the patient presented for the first surgical intervention. The patient was unable to recall the exact duration of symptoms; however, confirmed symptoms had been present for greater than two months. Initial treatment consisted of incision, wide debridement and drainage, following which the patient was discharged with daily community nursing services attending to packing of the wound with a hydrofibre rope (Aquacel®). In the ensuing days the patient experienced increasing pain, exudate and odour from the wound and was referred for a second opinion with a colorectal surgeon at a second hospital and care was taken over.

PRESENTATION

It was arranged for the patient to be reviewed in the Stomal Therapy Outpatient Clinic by a colorectal surgeon and stomal therapy and wound care nurse (STN) at the second hospital. On examination there was purulent exudate, offensive odour, erythema and induration of the surrounding tissue and

pain. There was a deep subcutaneous cavity under the right buttock tracking towards the anus resulting from the inflammatory process and infection. A length of ribbon gauze was found packed deep under the flap, this had been retained within the wound track for at least 7 days and not been detected during subsequent daily re-packing. The retained dressing was the result of irregularity in the staff allocated to review and attend to wound care, with several different nurses visiting the patient during the early treatment period. Following this incident the patient and family wanted consistency of care and decided to attend the outpatient wound clinic for ongoing assessment and management.

DISCUSSION/INTERVENTIONS

The wound infection persisted and was confirmed with microbial wound culture. The infection in the wound sinus where the ribbon gauze had been packed resulted in further breakdown of the wound, leading to the development of a subcutaneous extension in a caudal direction towards the anus with a skin bridge between the two wounds. This second wound was <1 cm from the anus. Having two wounds complicated the dressing regime and the proximity to the anus made keeping the wound free from faecal contamination challenging (Figure 1).

Initially the wound was irrigated with saline and packed with a silver hydrofibre (Aquacel Ag® — see Table 2). Oral antibiotics and analgesics were prescribed. Daily reviews were conducted by either the colorectal surgeon or STN and the patient's mother was taught how to attend to wound dressings. An examination under anaesthesia (EUA) was arranged for the following week where the wound was washed out and a VAC® (Vacuum-assisted closure — topical negative pressure wound therapy — TNPWT) dressing was applied. The TNPWT was changed in the operating theatre on the first 3 occasions, as general anaesthetic was required due to severe pain and the difficulty of creating a seal with the distal wound being <1 cm from the anus. A Coloplast Brava® Ring was used to seal around anus. Brava® Rings were selected for their adhesion and durability, they have minimal breakdown with moisture due to the composition of hydrocolloids and ethylene vinyl acetate (EVA) co-polymers[5].

In an effort to minimise disruption to the patient's routine, treatment was primarily done on an outpatient basis with most surgical procedures and/or dressing changes performed as day-only cases. The patient continued to attend school with TNPWT. After the first three dressing changes in the operating theatre, subsequent changes were attended in the Stomal Therapy Outpatient Clinic with Methoxyflurane inhaled analgesia for pain relief. Self-administered methoxyflurane inhalation has strong analgesic properties which met the requirements for this patient and dressing changes were well tolerated. Inhaled methoxyflurane should be limited to a maximum daily dose of 6 ml and a total of 15 ml weekly. Use on consecutive days is not recommended and inhaled Methoxyflurane is contraindicated in patients with renal failure or renal impairment[6]. This patient required 3 ml of inhaled Methoxyflurane for each TNPWT dressing change and this was limited to twice weekly, with renal function checked weekly. Caution should be taken with the ongoing prescription of narcotics and their use should be tapered as appropriate and the use of medications such as inhaled Methoxyflurane can be useful for managing the acute pain experienced during dressing changes. VAC® white foam was used as it was less painful on removal than VAC® Granufoam. TNPWT continued for 28 days.

Appropriate assessment of pain is important when treating chronic PNS disease as patients come to fear interventions and dressing changes[7]. This fear may manifest as depression which has been linked to the delayed wound healing or anxiety when anticipating pain during dressing changes[7,8]. Furthermore, delayed healing can result in emotions such as anger, frustration and uncertainty[5]. Physical inactivity may result from pain or apprehension about causing further trauma to the wound, this can lead to weight gain which may further negatively impact on the psychological wellbeing of some patients[8]. A chronic PNS wound can affect many aspects of the patients life including, work/education, leisure/sporting ventures and social activities[5]. Therefore, clinicians should incorporate a mental health assessment into the treatments plan and encourage patients to maintain self-care, independence and their usual routine where feasible.

PNS wounds have been shown to affect the psychological wellbeing of some patients[7,8] and this patient initially saw an adolescent Psychologist. A subsequent referral was made to a Clinical Psychologist within our hospital when the need for further assistance was identified. The patient was then referred to an external, age appropriate counselling service for ongoing care.

After 41 days of treatment a family conference was held with the patient, his parents, the colorectal surgeon, a plastic surgeon and the STN, to discuss surgical interventions such

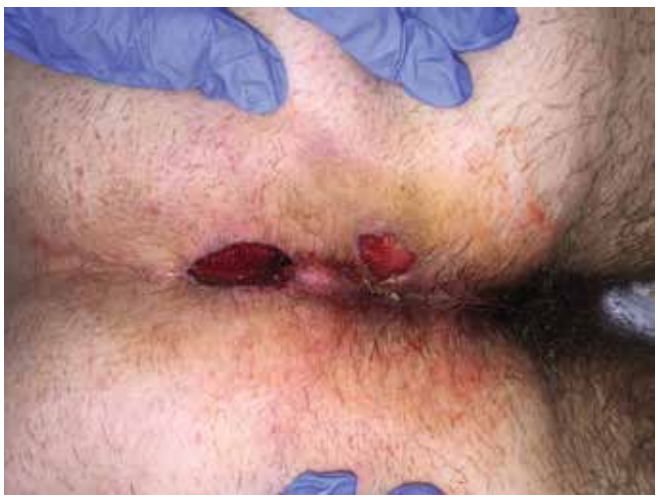

Figure 1: Day 35 — breakdown of the distal end of the sinus track

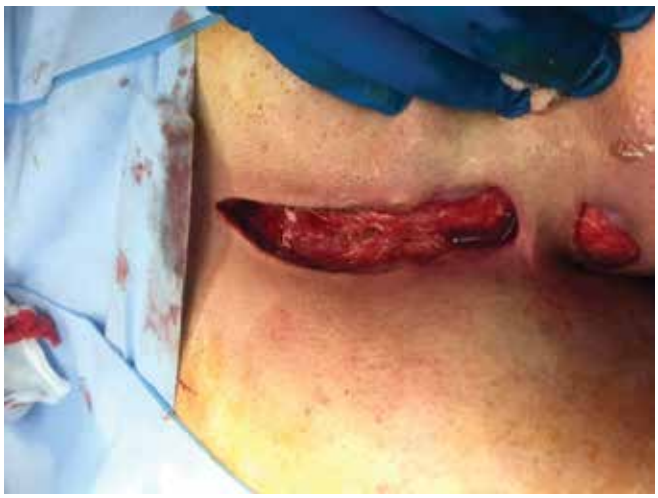

Figure 2: Day 100 — following EUA debridement, curettage and washout

as a Rhomboid or VY flap and the possible complications. The decision to continue with conservative wound therapy was agreed upon as the preferred option. The possibility of hyperbaric oxygen therapy was discussed as an option if conservative wound treatments were unsuccessful. A time line of wound progress, interventions and the wound therapies implemented has been included as Table 1. Table 2 highlights the intended action of the wound care products used, providing the rationale for their introduction.

The patient was readmitted with increased pain and fevers after 91 days and underwent another EUA, debridement, curettage and washout (Figure 2). A third opinion was sought from a colorectal surgeon at another institution and the patient was advised to undergo a colostomy and flap reconstruction. It was determined a colostomy would be required due to the proximity of the wound to the anus (Figure 2).

After 162 days the epithelial tissue that had covered some of the upper wound edges and base completely broke down leaving a 9 cm long upper wound, with the distal wound now measuring 3 x 1.5 cm. A further EUA and curette was performed and the wound was packed with Promogran Prisma®. Biatain Ag® (silver polyurethane foam dressing) was continued on the right perianal wound as there was finally some improvement being seen (Table 1).

After 43 days of using Promogran Prisma®, there had been no improvement in the upper wound; however, the distal, right perianal wound that had been dressed with the silver polyurethane foam dressing for just 24 days was now covered with epithelial tissue. The patient was readmitted to the colorectal unit and the proximal wound was soaked in Prontosan® prior to the recommencement of TNPWT (Figure 3). The following day the patient was discharged with subsequent dressing changes attended in the Stomal Therapy Outpatient Clinic with Methoxyflurane used for analgesia. Dressing changes were well tolerated and TNPWT continued for 18 days. The TNPWT was ceased due difficulty

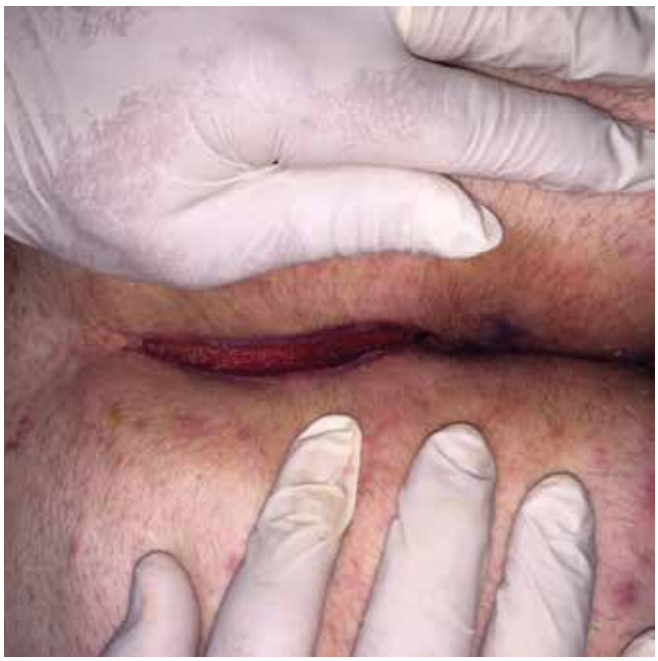

Figure 3: Day 238 — wound progress, perianal wound healed

maintaining a seal and moisture-associated dermatitis to periwound skin. Wound packing with the silver polyurethane foam dressing was commenced, with the patient's mother changing dressings twice daily due to exudate levels and twice weekly reviews in the Stomal Therapy Outpatient Clinic were maintained. Within 10 days of changing to the silver polyurethane foam dressing epithelial tissue began to appear in the wound bed and after 94 days the wound was finally healed, this was 343 days from the initial consultation (Figure 4). This healing time is substantially longer than the reported healing time of 21–72 days following laying open and curettage of PNS tracks[9].

In this case the patient was initially reviewed daily, this was reduced to twice weekly, then weekly until wound closure was achieved. After the wound was completely healed the patient was referred for laser hair removal. Small studies have shown decreased recurrence of PNS following laser epilation[9], whereas razor hair removal (shaving) can potentially increase the risk of long-term recurrence[11].

WHAT THIS PAPER ADDS:

Patients and their families benefit from ongoing review and communication with their surgeon and wound care specialist regarding wound progress and the rationale for alterations in the treatment plan. Consistency in the team caring for the patient enables the early recognition of changes to the wound and early intervention when required. A pain assessment and psychological assessment should be routinely incorporated into the treatment plan, with referral to the pain service or psychologist as appropriate. Inhaled Methoxyflurane can be used to effectively manage acute pain during dressing changes in the outpatient setting. The wound care product

that led to the most significant improvement in both the wounds documented in this case was the silver polyurethane foam dressing; however, further studies into the effectiveness of this product in treating chronic PNS disease are required.

CONCLUSION

Ideally a short acute hospital admission is all that will be required follow the initial surgical intervention for PNS disease. Subsequent care can be continued on an outpatient basis with the intention of minimising disruption to activities of daily living such as work/study, leisure and social activities. Patients require access to consistent outpatient services for ongoing care and review. If the wound fails to heal and becomes chronic, further investigations and interventions must be conducted. Patients require education regarding wound hygiene, the rationale for the interventions performed and the wound products chosen. Finally, the psychological impact of having a chronic wound should not be underestimated and should be assessed as part of routine care with appropriate referrals made for supportive care.

ACKNOWLEDGEMENTS:

We wish to thank the patient for consenting to sharing his story and photographs. Further, we would like to acknowledge the contribution of his mother for her dedication to providing ongoing wound care. The wound had superficial breakdown after 4 months, with the development of a 1 cm long 0.5 cm deep ulcer. This took 36 days to heal. A further 6 months later another 1 cm long opening occurred in the centre of the previous PNS scar, this healed after 33 days. Both recurrent wounds were treated by clipping surrounding hair, removal of hair and foreign material from the wound bed, daily irrigation with Pronotsan® and overlaying with Biatain Ag®.

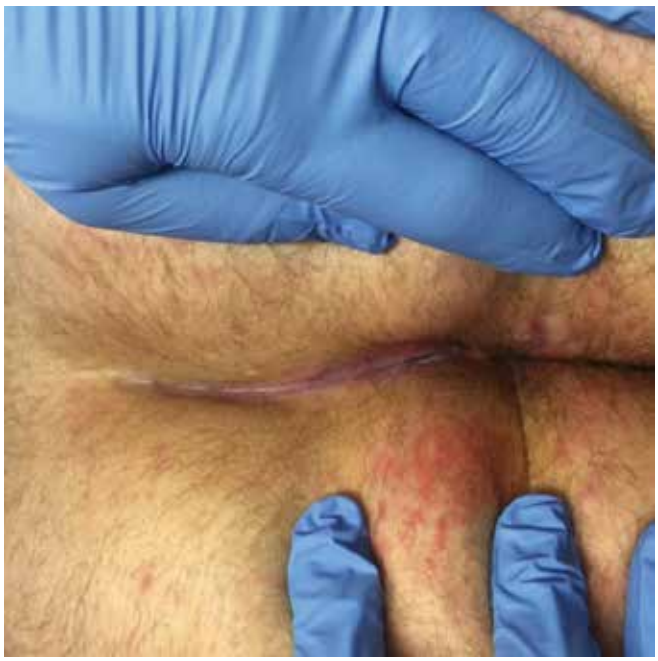

Figure 4: Day 343 — wound closure achieved

Table 1: Interventions, duration and outcomes

Intervention/Wound product	Duration	Outcome
Second opinion — wound assessment and removal of retained ribbon gauze packing	Initial consultation at second facility	Purulent exudate, offensive odour, severe pain, erythema of periwound tissue.
Aquacel Ag packing **Day 1–7**	Commenced therapy — continued for 7 days	Purulent exudate — pain.
EUA, debridement, washout and application of VAC dressing **Day 7–11**	4 days	Purulent exudate. Wound 7 cm long. Connected to wound on right buttock near anus 4 cm diameter. Histopathology: inflamed granulation tissue. Wound culture: mixed coliforms.
OT: change of VAC. Opening on the left lower side of the natal cleft closed with vicryl suture to facilitate application of the VAC (wound 2 adjacent to anus) **Day 11–14**	3 days	Dimensions unchanged. Granulating.

Table 1 (continued): Interventions, duration and outcomes

OT: washout cavity + reapply VAC (oral AB) **Day 14–19**	5 days	Vicryl sutures tore through skin — breakdown of opening to right of anal verge now 1.5 cm diameter with connection to cavity. VAC reapplied with white foam — no foam inferiorly under skin bridge. Separate foam covering right anal verge opening. Cavity clean and granulating.
Review in stomal therapy clinic — VAC seal lost — air leak — resealed using inhaled Methoxyflurane for analgesia **Day 19–20**	1 day	VAC therapy continuous 75 mmHg.
Change of VAC dressing in OT VAC reapplied with white foam **Separate foam covering right anal verge opening** **Day 20–26**	6 days	VAC therapy increased to 125 mmHg.
Changed VAC in stomal therapy clinic using inhaled Methoxyflurane for analgesia **Day 26–29**	3 days	Main wound clean and granulating — decreased in size. Wound near anus increased in size — difficult seal — applied Coloplast Brava® ring to create a seal around the anus.
Changed VAC in clinic using inhaled Methoxyflurane for analgesia **Vacutex to right perianal wound** **Day 29–32**	3 days	Second wound to right of anus increased in size (4 x 3 cm), undermined edges and painful. Unable to incorporate into VAC dressing and retain seal around anus.
Changed VAC in clinic using inhaled Methoxyflurane for analgesia **Day 32–35**	3 days	Could not tolerate Vacutex due to pain — Commenced on Targin (Figure 1).
VAC ceased **Packed with Aquacel Rope** **Daily sitz baths** **Day 35–41**	6 days	Perianal wound increased in size and extending towards anus. Difficulty maintaining VAC seal. Family conference — colorectal surgeon, plastic surgeon, stomal therapy nurse, patient and parents.
OT: EUA and flexible sigmoidoscopy. Wound packed with Aquacel Rope **Day 41–46**	5 days	No fistula. Wounds remain connected under a skin bridge.
Aquacel rope to upper wound Aquacel Ag to perianal wound **Day 46–57**	11 days	Upper wound packed. Perianal wound overlay with Aquacel Ag. Haemo-purulent exudate.

Table 1 (continued): Interventions, duration and outcomes

Upper wound packed with Aquacel Ag **Commenced UrgoStart to perianal wound** **Day 57–76**	19 days	Upper wound granulating but now tracks proximally by 6 cm and the both wound remain connected under a skin bridge. Perianal wound painful and has hypergranulation tissue. Silver nitrate applied.
Upper wound packed with Aquacel Ag **Commence Prontosan irrigation and UrgoStart to right perianal wound** **Day 76–100**	24 days	Presented to stomal therapy clinic with increased pain in upper wound no change in wound appearance.
OT: EUA and debridement of pilonidal wound **Base of wound curetted** **Day 100–106**	6 days	Histopathology: Exuberant, inflamed, organising granulation tissue. Wound dimensions 10 cm long, 3 cm wide, 3 cm deep. Hair clipped from wound edges (Figure 2).
Changed to Aquacel Ag, Aquacel Extra and Zetuvit Plus. Continue Pronotsan irrigation and UrgoStart to perianal wound **Day 106–113**	7 days	Decreased pain.
Changed to Vacutex to upper wound and Zetuvit Plus. Continue Pronotsan irrigation and UrgoStart to perianal wound **Day 113–120**	7 days	Purulent exudate 10 cm long, 1 cm wide, 1 cm deep.
Continue Vacutex to upper wound and Zetuvit Plus. Continue Pronotsan irrigation and UrgoStart to perianal wound **Day 120–127**	7 days	Minimal change to wound. Purulent exudate persists.
Continue Vacutex to upper wound and Zetuvit Plus. Changed to Acticoat to perianal wound **Day 127–135**	8 days	Wound granulating 9 cm long, 1 cm wide, 1 cm deep. Perianal wound 2 cm wide, 3 cm long.
Continue Vacutex to upper wound and Zetuvit Plus. Changed to Biatain IBU to perianal wound **Day 135–145**	10 days	Acticoat caused pain — changed to Biatain IBU — due to start HSC exams.
Continue Vacutex to upper wound and Zetuvit Plus. Continue Biatain IBU to perianal wound **Day 145–155**	10 days	Epithelial tissue in central portion of upper wound, remaining wound healthy granulation tissue. Perianal wound increased in size 2.5 cm wide, 3.5 cm long. Hair clipped from wound edges.

Table 1 (continued): Interventions, duration and outcomes

Continue Vacutex to upper wound and Zetuvit Plus. Changed to Biatain Ag to perianal wound **Day 155–176**	21 days	Epithelial tissue in central portion of upper wound, increased purulent exudate, new proximal and distal tracking of upper wound. Right perianal wound decreased in size 1.5 cm wide, 3 cm long.
Changed to Pronotsan irrigation and Biatain Ag packing to upper wound covered with Zetuvit Plus. Continue Biatain Ag to perianal wound. **Day 176–184**	8 days	Complete breakdown of upper wound 9 cm long, 1 cm wide, 1 cm deep. Right perianal wound unchanged.
Changed to Promogran Prisma to upper wound — covered with SilNet and Zetuvit Plus. Continue Biatain Ag to perianal wound. **Day 184–202**	18 days	Upper wound dimensions unchanged. Perianal wound mostly covered with epithelial tissue. Hair clipped from wound edges.
EUA proximal & distal tracks opened and curetted. Promogran Prisma to upper wound — covered with SilNet and Zetuvit Plus. Continue Biatain Ag to perianal wound. **Day 202–210**	8 days	Upper wound 10.5 cm long, 1 cm wide, 1.5 cm deep. Perianal wound healed.
Inconsistent wound care over the last few weeks — parents had been overseas — only reviewed in wound clinic on 3 occasions. Promogran Prisma to upper wound — covered with SilNet and Zetuvit Plus. VAC therapy recommenced. **Day 210–246**	36 days	Upper wound 11.5 cm long, 1 cm wide, 1.5 cm deep. Tracks by 0.5 cm proximally and distally. Hypergranulation tissue in wound bed — purulent exudate. Perianal wound remains healed. Readmitted and VAC therapy recommenced. Hair clipped from wound edges (Figure 3).
VAC dressing changes using White Foam and requiring inhaled Methoxyflurane. **VAC ceased, packed with Biatain Ag and covered with Zetuvit plus.** **Day 246–265**	19 days	VAC therapy changed twice weekly in outpatient wound clinic. Increased haemopurulent exudate. Decreased hypergranulation tissue; however, wound increased in size, making it difficult to maintain seal. Wound dimensions 9.5 cm long and tracts proximally by 0.5 cm and distally by 2 cm. VAC therapy ceased.
Packing wound with Biatain Ag continues **Day 265–275**	10 days	Epithelial tissue to wound edges and some of wound bed. No tracking of wound. Patient commenced working 2 days per week.
Packing wound with Biatain Ag continues **Day 343**	68 days	Wound completely covered with epithelial tissue (Figure 4).

Table 2: Wound products, supplier and intended action

Wound product name	Manufacturer/Australian Supplier	Action/rationale for use
Aquacel Ag	ConvaTec Level 2, Building 5, Brandon Business Park, 530 Springvale Road, Brandon Park, Victoria, 3150, Australia Tel 1800 335 276 **convatec.com.au**	Aquacel Ag is a hydrofibre. It is a water soluble form of sodium carboxymethyl cellulose that absorbs exudate and turns into a stable gel when in contact with wound exudate. Provides a moist wound-healing environment and causes minimal pain or trauma on removal. Silver ions are released to the wound providing a controlled delivery and offering a broad range of effectiveness against antibiotic-resistant wound pathogens. Can decrease pain and time spent on dressing changes[12].
VACUTEX	Protex Healthcare Australia	VACUTEX is a three-layer poly-cotton dressing that promotes accelerated capillary action on wound interfaces. The three layers lifts, transport and retain exudate. Therefore, it aids in the removal of bacteria and prevention of maceration of the surrounding tissue[13].
Biatain IBU	Coloplast Australia Level 4, 1 Acacia Place Ferntree Business Park 310 Ferntree Gully Road Notting Hill, VIC 3168 Australia Tel +61 3 9541 1111 **www.coloplast.com.au**	Biatain IBU is a foam dressing with continuous low-level release of ibuprofen. Results in reduced chronic pain between dressing changes, reduced acute pain at dressing change. It promotes increased healthy granulation tissue, decreased periwound erythema and has good exudate handling capacity[14].
Biatain Ag	Coloplast Australia Level 4, 1 Acacia Place Ferntree Business Park 310 Ferntree Gully Road Notting Hill, VIC 3168 Australia Tel +61 3 9541 1111 **www.coloplast.com.au**	Biatain Ag is a soft and conformable polyurethane foam dressing with a patented silver complex. The 3D foam structure of Biatain Ag conforms closely to the wound bed providing sustained release of silver providing a continuous antibacterial effect for up to 7 days. Ionised silver (Ag+) has both anti-inflammatory and antimicrobial properties, with a broad spectrum of antimicrobial action. Ionic silver appears to be incorporated into the bacterial cell wall and bacterial DNA, thereby blocking vital metabolic processes and cell proliferation[15].

Table 2 (continued): Wound products, supplier and intended action

Promogran Prisma	KCl Medical an Acelity Company Level 7, 15 Orion Road Lane Cove West, NSW 2066 Australia Tel 1300 524 822 **www.kci-medical.com.au**	Promogran is composed of 55% collagen, 45% oxidised regenerated cellulose (ORC) and silver. Bacteria, elevated levels of inflammatory cytokines and proteases imbalance are detrimental to healing and often present in chronic wounds. The combination of collagen/ORC/silver is effective at reducing inflammatory protease activity. A reduction in inflammatory protease activity will help rebalance the biochemical environment of the wound and facilitate healing[16].
UrgoStart	Urgo Medical Distributed by: Link Healthcare 5 Apollo Street, Warriewood, NSW 2102, Australia Tel +61 (2) 8401 9785 **www.urgomedical.com.au**	UrgoStart is a hydroactive polyurethane foam dressing containing a nano-oligosaccharide factor (NOSF). NOSF neutralises supernatant matrix metalloproteinases (MMPs) which are known to inhibit wound healing[17]. Excess proteases stimulate the destruction of the dermis and slow the healing process[18].
VAC	KCl Medical an Acelity Company Level 7, 15 Orion Road Lane Cove West, NSW 2066 Australia Tel 1300 524 822 **www.kci-medical.com.au**	Topical negative pressure wound therapy (TNPWT) increases wound healing rates by increasing the rate of cell division and the production of granulation tissue through increased wound oxygenation, promoting blood flow and reducing bacterial counts. TNPWT reduces tissue oedema by removal of excess interstitial fluid and increasing healing rates[19].
Zetuvit Plus	Hartmann Level 5, 1 Thomas Holt Drive, Macquarie Park, NSW 2113, Australia Tel 1800 805 839 **https://hartmann.info/en-AU**	This is a cost-effective absorbent pad with SAP technology (a blend of cellulose fluff and a superabsorbent polymer — SAP)[20]. A comfortable dressing that absorbs and retains exudate and protects periwound skin from exudate[20]. Used as a secondary dressing on this patient.
Prontosan	B Braun Australia Level 5, 7–9 Irvine Place Bella Vista, NSW 2153, Australia Tel 1800 251 705 **http://www.bbraun.com.au**	In an RCT comparing normal saline with propylbetaine-polihexanide solution (Prontosan), Prontosan had higher efficacy demonstrated with favourable statistically significant differences in reduction of inflammatory items, reduction in wound size and improvement in granulation tissue[21].

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