THE MODIFIED USE OF SURFASOFT® IN SKIN GRAFTS: CASE SERIES

Utilisation du Surfasoft® sur les greffes de peau: une série

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SUMMARY. Surfasoft® is a monofilament woven polyamide thread. Its use over skin grafts has always been combined with other occlusive dressings. Its rapid application and transparent property makes it an ideal primary dressing in the absence of any occlusive layers after the first two days following skin graft application. We describe this modified use in our case series. We modified the use of Surfasoft® in four different burns patients and one skin cancer case. Surfasoft® was predominantly used on difficult sites and secured with either staples or sutures. A secondary occlusive dressing was only applied in the first 48 hours, then removed, leaving Surfasoft® as a single dressing until it spontaneously separated from the graft approximately 7-10 days post op. Complete healing of grafts was defined when dressing was no longer required. The majority of burns were full thickness with an average TBSA of 6.5%. Distribution was mainly to the neck and upper torso areas. The skin cancer was located on the right shoulder region. Graft healing was completed in 3-4 weeks following surgery. No complications were reported. Advantages of the modified Surfasoft® in addition to factors associated with graft survival in our series are discussed. The modified Surfasoft® was shown to be a simple and reliable dressing for meshed STSGs in both burns and elective procedures. We believe that it can be effectively used in sites associated with poor tolerance to conventional dressing and when nursing resources are limited.

Keywords: Surfasoft®, skin grafts, STSGs, transparent, dressing

RÉSUMÉ. Surfasoft® est un filet de polyamide monofilamentaire tressé. Son utilisation sur les greffes cutanées a toujours été combinée à un pansement occlusif. Son application rapide et sa transparence en font un pansement idéal, passés les 2 premiers jours après la greffe, où l’adjonction d’un pansement occlusif est nécessaire. Nous présentons une utilisation modifiée de Surfasoft® chez quatre patients brûlés et un souffrant de cancer cutané. Il a été utilisé dans des zones difficiles et maintenu en place par une suture ou un agrafage. Un pansement occlusif a recouvert Surfasoft® pendant 48 h puis a été ôté, laissant Surfasoft® seul sur la greffe, de laquelle il s’est séparé au 7e-10e jour; cette séparation définissant la cicatrisation. Les brûlures étaient profondes et atteignaient une surface moyenne de 6,5% sur le cou et la partie céphalique du thorax. Le cancer cutané était situé au niveau de l’épaule. La greffe était totalement intégrée à 3-4 semaines. Aucune complication n’a été observée. L’avantage de Surfasoft®, additionné aux autres mesures promouvant l’intégration des greffes, a été évalué. Il est facile à utiliser et semble être efficace après greffe cutanée, qu’elle soit réalisée sur une brûlure ou après chirurgie réglée. Nous estimons qu’il peut être utile dans des zones où les pansements sont mal tolérés ou difficiles à réaliser.

Mots-clés: Surfasoft®, greffe cutanée, pansement transparent

Introduction

The use of skin graft fixation material Surfasoft® (Tau-renon, Laan Van Zuid Hoorn 61, 2289 DC Rijswijk, The Netherlands) has become well established in burns surgery over the past years.1-3

Surfasoft® is a monofilament woven polyamide thread. It has many properties that make it a suitable dressing for skin grafts. It is transparent, smooth and strong. The flexible surface prevents bacterial adherence, shearing forces, and allows easy manipulation and shaping.1 This is in addition to providing continuous access for graft inspection throughout the take process.4 The porous pattern provides over 45% drainage of its surface, allowing easy passage of exudates without drying the actual surface, particularly in the early stages of graft take.1

It is historically well known that skin grafts survive and mature even if they are left exposed. However, traditionally, all skin grafts were dressed with a wide spectrum of materials in order to prevent any possibility of trauma or infection to a rather fragile graft at its initial stage. The most common pitfall of conventional dressings is adherence to the underlying graft. This can potentially lead to crusting and coagulation of the exudates, predisposing to pockets of infected material in contact with the graft surface. These welding spots transmit shearing forces and eventually lead to graft separation.2

Meshed skin grafts, however, require more attention. Ex-
pose is contraindicated in order to prevent crusting of the in-terstices, which as a result can lead to delayed healing. For this particular reason Surfasoft® was developed in order to provide a non-adherent interface, allowing frequent changes of dressing without the risk of dislodging the graft. It also has the addi-tional advantage of using topical antimicrobial to prevent any infection.2

These qualities make Surfasoft® a popular dressing for meshed skin grafts, particularly in burns. Traditionally, Surfasoft® has always been used in combination with other occlusive dressings. In our centre, it is used as a non-adherent and anti-shearing layer to protect skin grafts under the outer gauze dressings. Although this is easily achieved on a large and even body surface area, often the outer occlusive dressing is acci-dently dislodged in some areas after the first 48 hours post-op, risking shearing the graft off or introducing infection. This is especially observed in the neck, which is notoriously challeng-ing to conventional graft dressing, and may require meticulous care. Our successful modification, using Surfasoft® in an ex-posed fashion after the first 48 hours of skin graft application, has been highlighted in the five-case series.

Materials and methods

We describe this new experience in the use of Surfasoft® as a transparent dressing over meshed split thickness skin grafts (STSG) in five cases, covering a wide spectrum of burn wounds and one patient following cancer surgery.

The senior author managed all five cases, applying the same technique, postoperative instructions and follow up.

The average grafted total body surface area (TBSA) was approximately 6% in the four burn cases. Most of the grafted areas were on difficult body parts, which included mobile, uneven (concave or convex) surfaces such as the neck, buttocks, shoulders and arms.

The STSG size required was harvested from the anterolat-eral thigh using an appropriate thickness to average depth of 8/1000. Meshing technique varied from 1.5:1 to 2:1 ratios. Surfasoft® in all five cases was secured with sutures or staples. A combination of dry gauze, wool and bandages or self-adhesive fabric tape was used as occlusive dressing over the layer of Surfasoft® for the first 48 hours after graft inset. All the over-lying dressing was removed thereafter, leaving only the fixed Surfasoft® in situ until complete graft take. This is normally indicated following removal of all sutures or staples on day 7 post-op, leaving the Surfasoft® to peel off spontaneously. Donor sites were dressed with a layer of calcium sodium algi-nate dressing, gauze and self-adhesive fabric tape.

Case series

Case 1: A 47-year-old female with past medical history of syndrome of inappropriate secretion of anti-diuretic hormone (SIADH), hypo-osmolality and hyponatraemia, and depres-sion. She sustained 9% TBSA full thickness flame burns when she deliberately set fire to her house. Her burns were predominantly distributed around her neck, shoulders, upper chest, right arm and left arm, in addition to patches over her fingers (Fig. 1).

On arrival, she was intubated and admitted to the ITU for some time due to inhalational injury, which was complicated by severe chest infection. During this period, her burns were dressed with Flamazine® cream (Smith & Nephew Pharmaceuticals Ltd, Hessle Road, Hull, HU3 2BN, UK).

Eventually she had a tracheostomy before she was trans-ferred to the main ward. Due to these complications her sur-gical treatment was delayed. In addition, further investigations were undertaken to rule out causes of persistent hypona-traemia, which included staging CT scan, FNA of a thyroid nodule and bronchoscopy. She eventually underwent tangen-tial excision of most of her burns and application of 2:1 meshed STSGs nearly a month after the injury. Approximately 5% TBSA of the meshed grafts were dressed with Surfasoft® and secured with staples. A secondary dressing of Acticoat® (Smith & Nephew Pharmaceuticals Ltd, Hessle Road, Hull, HU3 2BN, UK) and Gamgee® (Robinson Healthcare Limited, Lawn Road, Carlton-in-Lindrick Workshop, S81 9LB, UK) bolster tie over with 1/0 silk was used over the Surfasoft®. The secondary dressing was removed after 48 hours for first graft check and the Surfasoft® left exposed thereafter (Fig. 2). All grafts had completely healed three weeks after surgery (Fig. 3).

Case 2: A 26-year-old male with no significant past med-ical history, who was involved in a road traffic accident. He sustained 1% TBSA full thickness contact burn to his right but-toc area following contact with hot exhaust. In addition, he had multiple rib fractures, small left pneumothorax, left index
fingernail bed injury and left partial brachial plexus injury. He was initially admitted under the care of the cardiothoracic team who placed a chest drain and treated the rib fractures conservatively. Once stable, he was transferred under the care of the burns and plastics department and underwent repair of the left index fingernail bed injury and tangential excision of the burned area and application of 2:1 meshed STSG. This was dressed with Surfasoft® then secured with staples and covered with Acticoat® and Gamgee® bolster tie over. The secondary dressing was reduced after 48 hours to leave only the Surfasoft® until a first graft check at day ten showed satisfactory take (Fig. 4a-c).

Case 3: A 57-year-old female with past medical history of mild asthma who sustained 5% TBSA full thickness flash burns to her neck and upper chest while attempting to light a gas cooker. Her airway was cleared at presentation. She underwent tangential excision of the burned areas and application of 2:1 meshed STSGs three days after the incident. The grafts were dressed in the same manner as above. Her first graft check after seven days showed complete and successful graft take.

Case 4: A 74-year-old female with past medical history of hypercholesterolaemia, dyspepsia, seropositive rheumatoid arthritis, tendency to fall, and alcohol dependence syndrome. She sustained 11% TBSA mixed thickness scald burns to face, anterior thorax, abdomen, left shoulder, arm and hand in addition to right hand caused by chip pan oil. She underwent early tangential excision of 4% TBSA of anterior thoracic burns and application of 1.5:1 meshed STSGs. Two weeks later, she required further excision of the remaining areas on the chest and abdomen as well as on her arms and hands. On this occasion, chest and abdomen STSGs were fenestrated and applied using stapled Surfasoft® and secondary dressing in the same fashion as described before. At first graft check after one week all the grafts had successful take.

Case 5: This was an elective case of a large biopsy to confirm well-differentiated squamous cell carcinoma (SCC) (3 cm in diameter) on the right shoulder in an 81-year-old male (Fig. 5a). It was excised with a 1 cm peripheral margin down to the muscle fascia and closed with 2:1 meshed STSG, which was secured using absorbable sutures. Surfasoft® was used as a primary dressing and secured with non-absorbable sutures (Fig. 5b). Gauze and Hypafix® (BSN medical Limited, Willerby, Hull, HU10 6WT, UK) adhesive fabric tape was used as a secondary dressing only for the first 48 hours (Fig. 5c-d). The Surfasoft® was left exposed until the first graft check on day seven when it was removed, showing successful graft take.

Results

First graft check in all cases showed excellent take. Healing was completed in 3-4 weeks after surgery. All patients were followed up in the burns and plastics specialised dressing clinic and were also reviewed by the senior author. No intra-operative or post-operative complications, such as infection, bleeding, haematoma or graft failure were reported in any of the five cases.

Discussion

The use of Surfasoft® is well documented in the literature, and most of its uses are described in the care of burns patients. However, most of the cases published describe its use in com-
bination with other dressings up until the point of first graft check.\textsuperscript{2,3}\nnIt is already established that grafts, if left exposed, will survive and mature. Although intense nursing and medical supervision particularly in the first 48 hours of graft take is necessary in these cases, there is no informed evidence to suggest that secondary dressing has any additional advantages in improving graft survival.\textsuperscript{2}\n
Surfasoft\textsuperscript{®} has been used alone without any secondary dressing from the second day of graft application in burns patients, without any adverse effects on graft survival.\textsuperscript{4} This is clearly demonstrated in our case series where exposed Surfasoft\textsuperscript{®} was used with satisfactory results. This has an additional value particularly in burns patients when dressing patchy grafted areas or awkward body parts such as the neck, back, shoulders, buttocks, and axillae with a secondary bulky dressing would be difficult and impractical.\textsuperscript{2} Another important advantage of using exposed Surfasoft\textsuperscript{®} has been demonstrated when dressing STSGs on the scalp with reportedly good results.\textsuperscript{4}\n
Furthermore, fixation of meshed STSGs over large or anatomically difficult areas is time consuming. Being able to use Surfasoft\textsuperscript{®} with staples has a major advantage in rapid inset of STSGs along with immediate application of a primary dressing that is transparent, making graft inspection readily accessible.\textsuperscript{5} Unlike conventional dressing, the presence of an interface layer reduces the shearing forces that could potentially displace STSGs and therefore allows for regular changes of any secondary dressing without risking the integrity of the STSGs. Adherence of Surfasoft\textsuperscript{®} to the graft surface is not often encountered. It can be left in situ for up to 16 days and then easily removed.\textsuperscript{2} In our case series, we observed that Surfasoft\textsuperscript{®} was relatively non-adherent by the time first graft check was performed between the seventh and tenth day following STSG application. Tie-over dressings have commonly been used to secure STSGs in both burn cases and other elective procedures. Their advantages of preventing haematoma, fluid accumulation and shearing forces are well described on the ventral parts of the body. However, lack of elasticity in the commonly used threads may not provide the dynamic ability to accommodate for mobile or concave body parts. This rigid construct may be too weak to withstand the “stent” effect produced by the tie-over dressings on the back or buttocks. Therefore, applying and maintaining such dressing can be a potentially challenging task on large, mobile or concave body surfaces,\textsuperscript{5} especially following the first 48 hours post grafting. On the other hand, topical negative pressure therapy (TNP) has also been used in burns, and it has been advocated for irregular or mobile wound surfaces.\textsuperscript{6} However, it has the added disadvantage of cost, in addition to the inconvenience of the attached suction device for the patient, which could also restrict mobility. The process of bridging the epithelial cells across the interstices of the meshed STSGs is determined primarily by the size of the interstices and, to a certain extent, by the choice of dressing.\textsuperscript{7,8} There is some evidence to suggest that Surfasoft\textsuperscript{®} increases the rate of epithelisation compared to other conventional dressings.\textsuperscript{2,9} This is particularly important in burn patients when using large sheets of meshed STSGs. Broadly speaking, the general perception is to apply occlusive dressing over meshed STSGs in order to prevent infection, desiccation and haematomas.\textsuperscript{2} The results of our series using exposed Surfasoft\textsuperscript{®} as a primary dressing showed that the above complications are over estimated. In addition, the reduction of the outer dressing has a major impact on nursing time and medical care in both the inpatient and outpatient setting.\textsuperscript{4}\n
Although it is difficult to draw an objective cost analysis from the modified use of Surfasoft\textsuperscript{®} in our series, it is reported that there is no significant difference in the cost of materials used for dressing burns. A positive correlation between the percentages of TBSA burned, the number of health professionals involved and the total cost of dressings has also been found. Moreover, it has been concluded that the correlation will remain positive with the use of non-occlusive dressings or even when the quality, quantity and total cost of materials are different.\textsuperscript{10} This case series provides a preliminary indication of the benefits of using exposed Surfasoft\textsuperscript{®}, taking into account different scenarios and body surfaces. We acknowledge the limitations of this study, especially when considering the small number of subjects, the lack of a statistical model and the absence of a control group. However, we believe that the results of this case series may have the potential to be translated into a well designed, randomised, controlled trial.

**Conclusion**

Surfasoft\textsuperscript{®} has been shown to be a simple and reliable dressing for meshed STSGs in both burns and elective procedures. The advantage of using it exposed without any secondary dressing stems from its soft, porous, transparent and non-adherent properties. It is safe to use alone after an initial period of occlusive dressing, without any complications. Finally, it should be realistically considered for dressing STSGs in difficult and challenging areas, providing yet another successful and promising innovation in the world of skin graft dressing.

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