Surgical Management of Gudair® Sheep Vaccine Inoculation

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Sibon Fuzzard MBBS¹

Jeremy Richardson MBBS FRACS (Plas)¹

Julian Liew MBBS FRACS (Plas)¹

Jeremy Wiseman MBBS¹

Rodrigo P Teixeira MBBS FRACS (Plas)^{1,2}

¹Northern Health Melbourne, Department of Plastic and Reconstructive Surgery, 185 Cooper Street
Epping Victoria Australia 3076

²Senior Lecturer, The University of Melbourne. Melbourne Medical School, Grattan Street Melbourne
Victoria Australia 3010

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Correspondence to:

S Fuzzard

¹Northern Health Melbourne, Department of Plastic and Reconstructive Surgery, 185
Cooper Street Epping Victoria Australia 3076

Ph: +61 407 815 991

Email: sibon_fuzzard@hotmail.com

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Surgical Management of *Gudair*® Sheep Vaccine Inoculation

Fuzzard S¹, Richardson J¹, Liew J¹, Wiseman J¹, Teixeira R^{1,2}

¹Department of Plastic and Reconstructive Surgery, Northern Health. 185 Cooper Street Epping Victoria Australia 3076

²Senior Lecturer, The University of Melbourne. Melbourne Medical School, Grattan Street Melbourne Victoria Australia 3010

Correspondence to:

S Fuzzard

¹Department of Plastic and Reconstructive Surgery, Northern Health

185 Cooper Street, Epping, Victoria, Australia, 3076

Ph: +61 407 815 991

Email: sibon_fuzzard@hotmail.com

CLINICAL SCENARIO:

A twenty-one-year old farmhand presented to the emergency department following accidental right wrist self-inoculation with 1mL of *Gudair*® sheep vaccine. The vaccine contains heat inactivated *Mycobacterium paratuberculosis* and immune stimulating mineral oil, and controls Ovine Johne's disease, a chronic wasting condition [1]. Inoculation provokes a severe and prolonged immune response, requiring multidisciplinary management, including: surgical debridement, systemic steroids, and antibiotics.

On presentation, a puncture wound was visible on the volar wrist without significant cellulitis, swelling or residual inoculant. Inflammatory markers and xray were unremarkable. Ultrasound showed absence of discrete foreign body and subcutaneous oedema with hyperaemia at the injection site. Initial management was non-operative, involving admission, intravenous antibiotics and limb elevation. Subsequently, the patient was discharged on oral antibiotics.

One month later, the patient represented with swelling and pain at the inoculation site. Surgical exploration and debridement revealed significant reactive tenosynovitis from the volar forearm to the carpal tunnel. Histopathology (Figure 2) showed florid suppurative granulomatous inflammation, with no bacteria cultured. Subsequent debridement and wound closure were performed four days later with normal tissue both clinically and histologically.

The wound dehiscd six weeks following closure, requiring surgical re-exploration. Infection was excluded and histopathology revealed sterile granulomatous necrosis. High-dose steroids and serial debridement achieved wound control, and after two weeks of negative pressure therapy, facilitated placement of a split thickness skin graft over the exposed flexor carpi radialis tendon resulting from skin and subcutaneous tissue loss over the distal forearm and wrist. Physician input was imperative in guiding medical therapy with prednisolone. It commenced at 50mg daily and was weaned after achieving wound control.

After six debilitating months, requiring further debridements and admissions, wound healing was achieved. The patient underwent intensive and prolonged hand therapy rehabilitation, recovering full range of motion and power, and was able to resume farm work. Clinical photographs are seen in Figure 1.

DISCUSSION:

Accidental injection with veterinary vaccines have been previously published [5-9], with *Gudair®* inoculation reported in predominantly Veterinary literature. Inoculation can lead to significant morbidity secondary to immune mediated inflammatory reaction in surrounding tissues. Clinicians

should be educated regarding this and have a low threshold for early surgical intervention despite unremarkable clinical and radiological examination. This case demonstrates the potential clinical course without early intervention, and based on this, we would advocate for debridement on initial presentation in future cases. The distributor Zoetis Australia Pty Ltd, describes a grading system for exposures ranging from a simple splash amenable to local cleansing (Category 1), to injuries characterised by tissue necrosis and granulomatous ulceration warranting surgical debridement (Category 4) [1, 2]. A survey of the first fifty farms licenced to use *Gudair*® in Australia noted 21 vaccine exposures following 155,523 sheep inoculations. There were no reports of self-inoculation, only superficial skin contact or needle penetration without injection [3]. The survey is supplemented with six subsequently reported cases of self-inoculation after the vaccine became widely used, three requiring extensive surgical debridement. Isolated case reports include a delayed right shin debridement [1] and a patient requiring serial left palm debridements [4]. The hypothesis regarding pathogenesis is that mineral oil in combination with immunogenic cell wall fragments of the killed mycobacterium provoke inflammatory responses which do not respond to antibiotics. To date, the only definitive method to prevent tissue necrosis and granuloma formation is adequate surgical clearance [3]. With no obvious colour to identify *Gudair*® in vivo, surgery should excise both the inoculation site and underlying tissue.

Due to potentially severe consequences of inoculation despite benign initial presentation, education is necessary to ensure it is not overlooked. Patients affected are primarily in rural areas and require early transfer to specialised surgical centres for aggressive multidisciplinary management. Ongoing surveillance is required due to possible recurrent disease, as demonstrated in this case. Written information provided to farmers advises urgent medical care if inadvertently exposed, with a similar more extensive fact sheet available for doctors [2]. Vaccine distribution is only through approved vendors who provide this information to customers. With increased awareness regarding potential sequelae of veterinary vaccine needlestick injuries, clinicians should provide adequate treatment on initial presentation to prevent longer term debilitating consequences [6].

This case highlights that awareness of the severity of inoculation injury with the *Gudair*® sheep vaccine is not well known in metropolitan setting. Early surgical debridement should be advocated, as disease progression requires extensive and meticulous debridement, steroid therapy and prolonged admission. Despite severe debilitation, return to work is possible in a compliant and motivated patient that engages adequate allied health management.

CONFLICT OF INTEREST:

None.

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FIGURE LEGENDS:

Figure 1

*Clinical Photographs: **A** –Initial Presentation (Arrow indicating inoculation site). **B** – Intraoperative Findings (Initial Debridement). **C** –Clinical Findings at Recurrence. **D** – Long Term Outcome.*

Figure 2

Histopathology Photograph: Granulomatous Inflammation H&E 100x (Initial Debridement)

ANS_15517_Clinical Photos.png

ANS_15517_Histopath Image.png

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Author/s:

Fuzzard, S;Richardson, J;Liew, J;Wiseman, J;Teixeira, RP

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