

RARE PRESENTATION OF RESTRAINT INJURY OVER THE BILATERAL AXILLAE: A CASE REPORT

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ABSTRACT

Physical restraints are frequently used in intensive care units to prevent treatment interference in agitated patients. Although restraint-related complications are well documented, pressure ulcers occurring at unusual anatomical site are rarely reported. We report a 52-years-old male who developed bilateral axillary pressure ulcers following prolonged physical restraint during an intensive care unit stay after decompressive craniectomy for traumatic intracranial hemorrhage. Restraints were applied to the wrists and ankles with straps passing through the axillae. This case highlights a rare but preventable complication of physical restraint use. Proper application, vigilant monitoring, and early identification of complications are essential.

KEYWORDS

Restraint injury, bilateral axillae, latissimus dorsi musculocutaneous flap

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INTRODUCTION

Physical restraint can be defined as “any action or procedure that prevents a person’s free body movement to a position of choice and/or normal access to his or her body by the use of any method that is attached or adjacent to a person’s body and that he or she cannot control or remove easily.”¹ Reported rate of physical restraint use ranges from 23.0% to as high as 77.2% across different countries and healthcare settings. Delirium, altered level of consciousness, postoperative status, history of unplanned extubation, and the use of sedatives have been identified as factors associated with the application of physical restraints.²

Various methods are employed for physical restraint, including vest restraints, bed rails, wristrestraints, waistrestraints, geriatric chairs, geriatric tables, and improvised materials such as bedsheets. Injuries related to restraint use can broadly be classified as direct or indirect. Direct injuries include nerve damage, choking, asphyxiation, and even sudden death. Indirect complications associated with restraint use include dehydration, bladder and bowel incontinence, pressure ulcers, rhabdomyolysis, thrombosis, immobility, and prolonged length of hospital stay.^{3,4}

In the context of Nepal, there is limited awareness and a paucity of published literature regarding the use of physical restraints and their associated complications. This case report highlights an unusual presentation of a pressure ulcer occurring at an atypical anatomical site following physical restraint. We present a rare case of restraint-related injury involving the bilateral axilla, managed surgically with a latissimus dorsi musculocutaneous flap.

CASE REPORT

A 52-years-old male presented with ulcerative lesions in both axillae. He had previously undergone temporoparietal decompressive craniectomy with duroplasty for traumatic intracranial hemorrhage at another institution. He remained admitted in the intensive care unit for one month and was discharged five days prior to presentation.

According to the patient’s attendants, the patient became agitated during his ICU stay and was physically restrained. Both wrists and ankles were restrained, with straps passing through the axillae.



Fig. 1: Restraint-related pressure ulcer over the axilla prior to surgical debridement



Fig. 2: Post-debridement axillary defect demonstrating exposed underlying tissues



Fig. 3: Axillary reconstruction using a myocutaneous latissimus dorsi flap demonstrating complete defect coverage

On examination, an ulcer measuring approximately 8×10 cm was noted in the right axilla and a 4×5 cm ulcer in the left axilla with slough at the base (Fig. 1). Surgical debridement resulted in a well-defined axillary defect (Fig. 2). Definitive reconstruction was performed using a latissimus dorsi musculocutaneous flap for the right axilla (Fig. 3), while the left axillary defect was managed with split-thickness skin grafting. Written informed consent was obtained for publication of clinical details and images.

DISCUSSION

The use of physical restraints was legally established in the 1740s in English towns, allowing public authorities to restrain unruly individuals. Over the subsequent two centuries, an ongoing debate emerged between English psychiatrists advocating restraint reduction and American practitioners who more readily favored restraint use. During the 20th century, ethical concerns and growing evidence of associated morbidity led to regulatory and administrative efforts aimed at minimizing restraint use. These efforts emphasized education, continuous monitoring, and systematic data collection to reduce restraint-related incidents. The Joint Commission and the Centers for Medicare and Medicaid Services (CMS) have issued guidelines stating that physical restraints should be used only to ensure immediate physical safety of the patient, staff, or others, and must be discontinued at the earliest possible time, with continuous monitoring.⁵

Critically ill patients admitted to the intensive care unit often require multiple invasive procedures and supportive devices, which can cause significant discomfort and pain. This is frequently compounded by sleep deprivation, delirium, and the severity of underlying illness, leading to agitation and restlessness. Physical restraints are therefore commonly applied in ICU settings to prevent inadvertent removal of life-sustaining devices. While intended as a protective measure, restraints are associated with adverse outcomes, including cutaneous, vascular, and musculoskeletal injuries, increased delirium, and further agitation.^{4,6} In the present case, restraint use resulted in pressure ulcers at an unusual anatomical location - the bilateral axilla - highlighting a rarely reported complication.

Recent trends demonstrate an increasing reliance on chemical restraints, such as

ketamine and antipsychotic agents, compared with physical restraints. Even when physical restraint is required, there has been a shift toward the use of soft restraints rather than rigid devices.⁷ Several studies emphasize that education, staff training, and regular audits are key components in reducing restraint use. Alternative strategies, including pressure sensors for beds and chairs, have also been explored to minimize restraint application.^{1,8}

Reconstruction of axillary defects presents a significant challenge for plastic surgeons, as there is no universally accepted therapeutic algorithm. The reconstructive goal includes preservation or recreation of the central axillary concavity, restoration of the anterior and posterior axillary folds, protection of the neurovascular bundle, and provision of an elastic skin surface that allows full shoulder abduction. Various reconstructive options have been described, including thoracodorsal artery perforator flaps, muscle-sparing latissimus dorsi flaps, posterior arm flaps, and split-thickness skin grafts.⁹

First described by Tansini in 1906, the latissimus dorsi flap was initially used for coverage of large mastectomy defects and was later repopularized by Olivari and Boswick for reconstruction of radiation ulcers and breast defects. Achauer and colleagues subsequently described axillary reconstruction using fasciocutaneous flaps.¹⁰

The latissimus dorsi is a class V muscle, with a broad aponeurotic origin extending from the lower thoracic vertebrae, lumbar and sacral spine, and posterior iliac crest. It has a dominant blood supply from the thoracodorsal artery, with secondary perfusion from posterior intercostal perforators.¹⁰ The latissimus dorsi flap is the largest soft-tissue flap available, offering versatility in design, a wide arc of rotation, minimal donor-site morbidity, and reliable vascularity. The overlying skin is relatively hairless, donor-site scars are less conspicuous, and the flap provides adequate bulk for contour restoration.^{11,12}

Despite these advantages, the latissimus dorsi flap may be bulky and sometimes requires secondary thinning for optimal aesthetic results. Donor-site complications such as pain, seroma formation, scapular winging, and functional weakness - particularly in patients reliant on upper limb strength - have been reported. Flap necrosis and partial flap failure requiring additional procedures may also

occur, although technical refinements have significantly improved flap reliability.^{10,12}

In conclusion, restraint-related pressure ulcers may occur at atypical anatomical sites and can lead to significant morbidity. Proper restraint application, continuous monitoring, and early

intervention are essential. The latissimus dorsi musculocutaneous flap remains a dependable reconstructive option for extensive axillary defects.

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