



Research Article

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“Medical Adhesive Related Skin Injury” (MARSI), After Removal of Epidural Catheter Dressing”: Retrospective Audit

Mohammad Abdelmumen Abu Asal^{1*}, Ban Alkanani², Abdullah Fathi Nazal³, Muntaha Elayyan⁴ and Kristine Espinosa⁵

¹Pain Management Nurse, HMC, Al Wakra Hospital, Qatar

²Arab board in Anesthesia and ICU Specialist Anesthesiologist in Wakra General Hospital, Qatar

³CCT Consultant Anesthesiologist and Pain Management in Wakra General Hospital, Qatar

⁴Pain Management, HMC, Al Wakra Hospital, Qatar

⁵Pain Management, HMC, Al Wakra Hospital, Qatar

*Corresponding author: Mohammad Abu Asal, Pain Management Nurse, HMC, Al Wakra Hospital, Qatar

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Abstract

Background: It's well known that after any surgical procedure, wound dressing, fixing epidural catheter, tubes or drains to the skin may lead to skin damage that may occur when medical adhesives are not selected, applied and/or removed properly. In mild cases, there may not be any visible trauma. But in other cases, the injury can be more serious, requiring additional treatment. This can be presented as blisters, skin sluffing, and rash which is called Medical Adhesive Related Skin Injury (MARSI).

MARSI is therefore could be a reason for postoperative morbidity, increase patient discomfort and sometime prolong hospital stay.

The purpose of this retrospective audit is to identify the possible causes of MARSI following removal of epidural dressing in Al Wakra Hospital and offers solutions that could help reducing the incident of MARSI.

Methods: The 67 patients have been reviewed in this audit. All patients were under pain management team care for epidural analgesia follow up after surgery.

This audit conducted in Al Wakra Hospital from Jan 2021 till end of August 2022 after acquiring Hamad Medical Corporation Research Ethical Committee approval, Pain team gathered data collected retrospectively from two sources: the patients file and pain management follow up record. The data were imported into a database (Microsoft Excel) and analysed by pain team staff.

Result: The MARSI developed in 18 patients of the 67 patients included in the audit. The result shown that there were two types of skin injury occurred: Tension injury / blister in 10 cases (56%) and Skin Stripping in eight cases (44%). Lumber region, neck and shoulder were the most common affected area among patients, they were (33%), (22%) respectively.

Conclusion: This audit suggests that MARSI occurs due to the material of dressing itself, component of adhesive material and mechanical stretching in addition to the condition of underlying skin.

Introduction

Epidural analgesia or Patient Controlled Epidural Analgesia (PCEA) is an effective technique to control acute postoperative pain and in some surgical procedures considered as gold standard postoperative pain management that proved to reduce complications, improve patient satisfaction and early mobilization.

Pain management is a cornerstone in any healthcare system, therefore, all healthcare professionals across many specialties are seeking to provide a high level of care in pain management documentation, evaluations, outcomes, and avoid complications. So, the healthcare sectors around the world has recognized the importance of The Acute pain Service and the role of specialize pain management nurses [24]. Medical Adhesive Related Skin Injury (MARSIS) is "Skin damage related to the use of medical adhesive products such as tapes, wound dressings, stoma products, electrodes, medication patches and wound closure strips" [1].

MARSIS can increase length of hospital stays, patient discomfort, negatively affects wound healing and increased risk of infection.

Skin is considered the first line of defence against any infection. So, loss of skin integrity put patients under risk of infection, nerve endings damage and pain from irritation [2].

Components of mechanical medical adhesive-related skin injury

Skin stripping: Removal of one or more layers of stratum corneum occurring following removal of adhesive tape or dressing, lesions are frequently shallow and irregular in shape and skin may appear shiny, open lesion may be accompanied by erythema and blister formation.

Tension injury or blister: Injury (separation of epidermis from the dermis) caused by shear force as a result of distension of skin under an unyielding adhesive tape or dressing, inappropriate strapping of tape or dressing during application or when a joint or other area of movement is covered with an unyielding tape.

Skin tear: Wound caused by shear, friction and/or blunt force resulting in separation of skin layers, can be partial or full thickness.

Components of MARSIS due to Dermatitis

Irritant Contact Dermatitis: Non allergic contact dermatitis occurring due to chemical irritation; a well-defined area correlated with the area of exposure; may appear reddened, swollen and vesicles may be present; typically, of shorter duration.

Allergic dermatitis: Cell-mediated immunologic response to a component of tape adhesive or backing; typically appears as an area of erythematous, vascular, pruritic dermatitis corresponding to the area of exposure and/or beyond; persists for up to week.

Factors that could increase the risk of MARSIS

Extreme of Age, Race, Dermatologic condition (skin diseases), dehydration, malnourishment, and underlying medical conditions (Diabetic, Renal problems, Low immunity) and skin infection [3-5].

Methodology

All epidural catheters were inserted inside the operation theatre under aseptic technique by anesthesiologist, skin sterilization used either:

ChlorPreP with active ingredients are (2%) chlorhexidine gluconate (CHG) and (70%) Isopropyl alcohol (IPA) Patient Preoperative Skin Preparation (26ml).

DuraPreP with active ingredients are Iodine Povacrylex (0.7% Available iodine) and Isopropyl Alcohol (74% w/v) Patient Preoperative Skin Preparation (26ml).

After 20sec, the insertion procedure of epidural catheter starts then the epidural catheter secured first with small sponge over the insertion site and with two pieces of Transparent Adhesive Waterproof Film (OPSITE 28 x 15cm).

The OPSITE is a transparent, adhesive film. The film is moisture vapor permeable, conformable, and extensible". OPSITE dressing has many benefits such as keeping the wound environments moist, suitable for superficial skin injury, used as a secondary dressing, it is considered as water-resistant or waterproof items, and be able to use it over all part of the body [6].

On the other hand, there are many precautions that should be considered during the use of this item like keeping the patients under close observation and change the dressing daily.

Each patient is monitored and followed up by Clinical Specialist Nurse and two Pain Management Nurses, from the Recovery Room to the ward, the same team responsible for removal of epidural catheter and asses the skin condition after that.

Every patient with epidural catheter get assessed and examined by the acute pain team and the findings are documented using acute pain follow up record sheet both pre-and post-epidural catheter removal, then the documentation of each patient got uploaded to our electronic medical record software called Cerner.

The primary team is always notified after identifying the blister or skin redness to initiate proper management, while pain team keeps following the patients up until healing process of blister has been completed, then the progress updated in the patient's record. Finally, all these information were updated on designated Excel spreadsheet; developed by pain team to meet their goals. All this information was confidentiality secured as per the hospital policy [9,10].

Data Collection Procedure

All the data were collected retrospectively from the patients file and pain management follow up record after the approval of the HMC Research Ethical Committee. data collection form (see Appendix A) is designed to collect necessary data needed for this audit [11].

The following information is recorded on the data collection form: Patient demographic data, Speciality, comorbidity, Number of days on PCEA, Categories of skin lesion, Number of blisters, Site of

blister or lesion, Laterality, and other causes [12].

Results

During the period from Jan 2021 till end of August 2022 All anesthesiologists use standardized dressing technique.

Results showed:

- i. Number of patients included in this audit are 67 patients (18) of them develop MARSJ.
- ii. All patients had their epidural catheter dressing on for

one day or 48hrs only (Figure 1).

iii. Females were 51 (76.12%) compared to Males were 18 (23.88%) (See Figure 2).

iv. Two types of skin lesion noted Tension injury / blister 10 cases (56%) and Skin Stripping 8 cases (44%) (See Figure 3).

v. Lumber region, neck and shoulders were the most common affected area among patients (33%), (22%) respectively.

vi. The site of epidural insertion was the least common affected area with (6%) (Figure 4).

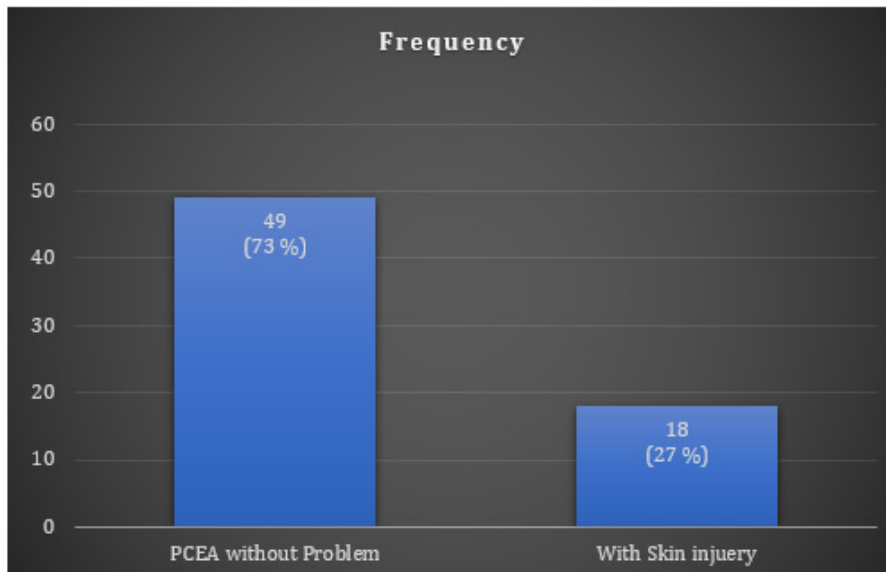


Figure 1: Illustrated the total number of patients had PCEA and number of patients who develop skin problems.

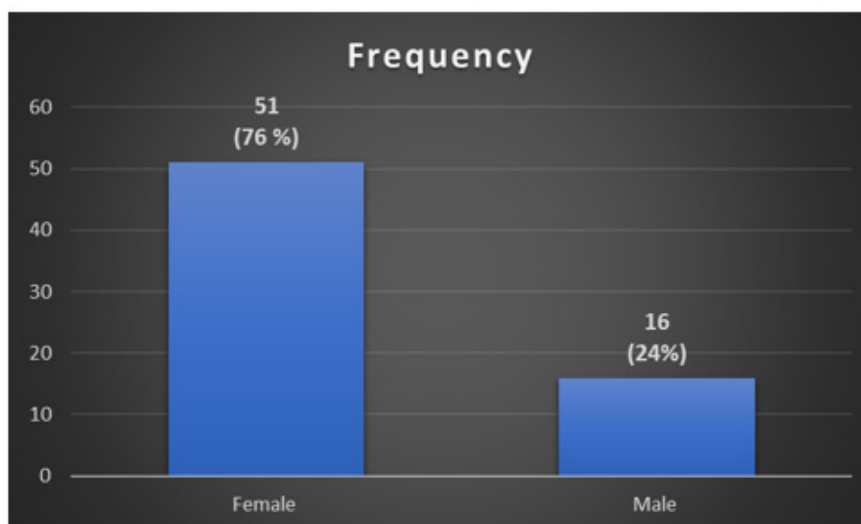


Figure 2: Gender Distribution.

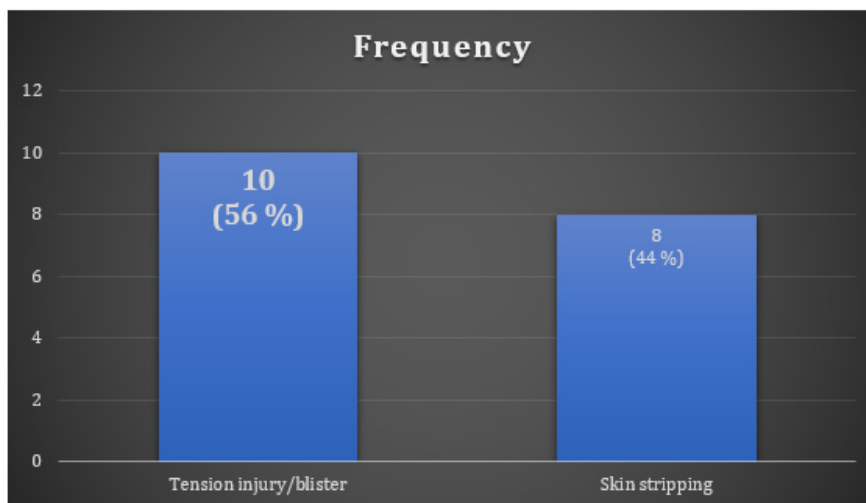


Figure 3: Types of Skin Injury.

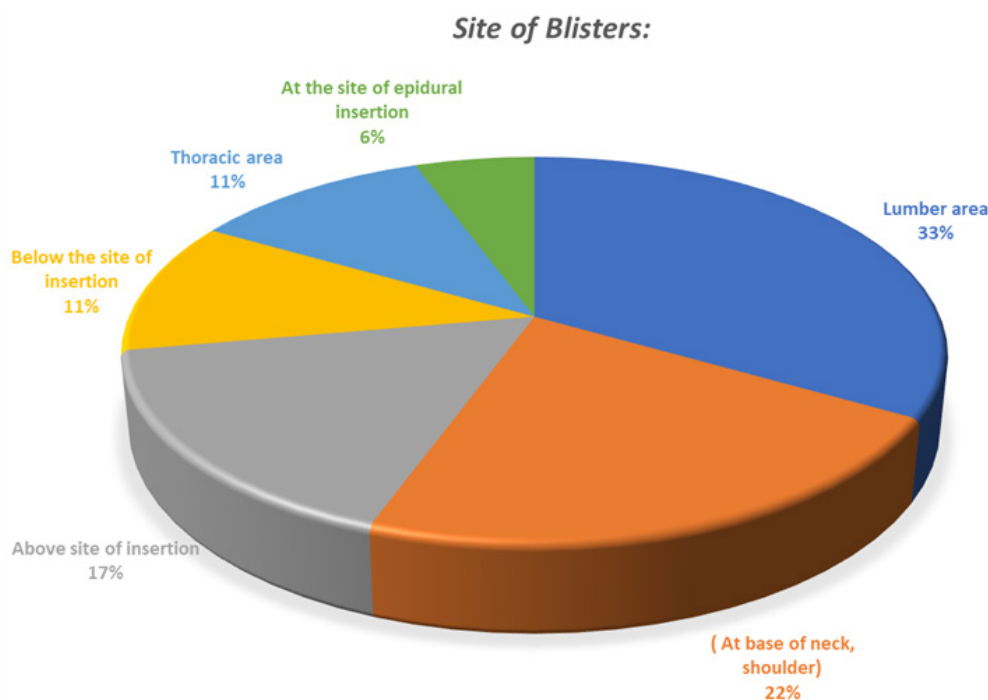


Figure 4: Site of Blisters.

Figure 4 details the frequency distribution of the affected areas encountered. The most affected areas were lumbar region, neck and shoulder (respectively, 33% and 22%). Followed by the area above the epidural catheter insertion which was (17%). Thoracic area and inferior to the epidural catheter insertion where (11%) each. The least affected area was at the place of epidural catheter insertion which was (6%) [13-15].

Discussion

Investigating and analysing the possible cause of such complications pointed out to the application of OPSITE dressing use for epidural catheter fixation [16-18].

OPSITE dressing recommendation that it should be changed daily which will increase the load on nursing staff, increase cost , keep the patient under stress, prolong hospital stay and finally frequent change of dressing will lead to a high incident rate of epidural catheter migration and dislodgment. There is no need to mechanically stretch the dressing during application because this may cause skin to wrinkle and fold under. It may also result in blistering or skin-stripping when the dressing is removed [19-24].

Conclusion

We concluded that MARSJ may be caused by the following predisposing factors: putting the dressing on wet skin, stretching,

leaving the dressing on for an excessive amount of time, patient having a condition like diabetes or a weakened immune system, having a skin condition like dry skin or another skin disease, being bedridden for an extended period of time, which may affect the circulation at the catheter site, and not changing the dressing every day.

Limitation

- I. Number of patients is limited.
- II. Most of the patients had their epidural catheter removed after 24hrs as per surgeon's decision

Recommendation

- i. Use the barrier film before applying the dressing.
- ii. Make adequate skin preparation.
- iii. Dryness should be permitted after sterilisation.
- iv. Use swap stick close to site of insertion and spray the back.
- v. To keep 5–15cm away from the skin surface during spraying and try to use a sweeping motion.
- vi. Ensure that the area becoming dry, after about 30 seconds before applying the adhesive tape.
- vii. Do not over stretch the dressing or the skin under during dressing.
- viii. Try to use the latest or up to date brand of dressing
- ix. Daily assessment of patient back by pain team.
- x. Finally, do not attempt to remove an adhesive tape fast and vertical, it is not only more painful, but it also creates a higher skin force than slow removal.
- xi. More studies need to be done involving larger number of patients.
- xii. Detailed and careful interrogative studies are needed to determine the cause and the mechanism that leads to medical adhesive related injuries MARS

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Conflict of Interest

We do not have an affiliation; either financial or non-financial, with any pharmaceutical, medical device, or communications and event planning company. We have not received any funding from pharmaceutical or medical device organization.

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Appendix A

Patient No.

Gender

Male Female

Age

18-39 40-60 above 61

Procedure

Comorbidity

DM HTN Hyperlipidemia Other.....

Specialty

Plastic Gynecology Orthopedic General Surgery Urology

PCEA Medication

Ropivacaine Levobupivacaine Levobupivacaine + Fentanyl

Dressing used

Number of days on PCEA

One Day Two Days Three day

Categories of mechanical medical adhesive-related skin injury

Skin stripping Tension injury/blister Skin tear

Number of Blisters

Blisters site

Shoulder Thoracic area Lumber area At the site of epidural insertion
 Below the site of insertion Not related to the dressing area

Laterality:

Right lateral midline Left lateral midline Midline

Factors that can contribute to the development of MARS

Extremes of age

Skin Conditions:

1. Eczema 2. Dermatitis

Malnutrition

Prolonged exposure to moist

Underlying medical condition:

1. DM 2. Infection 3. Renal problem 4. Immunosuppression 5. venous insufficient

Dehydration

Dry of skin

NA