

Histopathological Study of Clinically Suspected Marjolin Ulcer at a Specialized Major Burn Centre in Bangladesh

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Abstract

Background: Marjolin ulcer is a malignant transformation arising from chronic ulcers or scars from previously traumatized tissues that occur usually after burns. This study aims to study the histopathological profile of a suspected Marjolin ulcer at a major burn center in Bangladesh.

Methods: A retrospective analysis of all suspected Marjolin ulcer patients presented at the National Institute of Burn and Plastic Surgery, Dhaka, Bangladesh from 2020 to 2024 was done. A total of 92 patients of all age groups were included in the study.

Results: Most of the patients were between 31-60 years with an overall male preponderance. The most common cause for Marjolin ulcer was burn scars followed by trauma. Lower extremities were found to be the most predominant site. The latency period for the development of Marjolin ulcer was more than 20 years in most of the cases. Squamous cell carcinoma was the most common histological subtype.

Conclusion: Chronic non-healing ulcers or scars from previous trauma that do not respond to treatment should be carefully examined for malignant transformation. Histopathologically, these Marjolin ulcers in most of cases are squamous cell carcinoma.

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Introduction

Marjolin ulcer, a cutaneous malignancy, was first documented by a French surgeon, Jean Nicholas Marjolin, who observed the growth of ulcers over burn scars, which were not recognized as malignant at the time.¹ DaCosta characterized Marjolin ulcers as carcinomas that arise from burn scars.² Marjolin ulcer is a

very aggressive illness that arises from chronic wounds and skin scars, with burn scars accounting for over 65% of all diagnoses.³ It can also occur on discoid lupus erythematosus lesions, ulceration and chronic osteomyelitis, amputation stumps, chronic fistula regions, chronic wounds, and other conditions.⁴⁻⁷

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It can occur at any age, however it is less common in children.⁸ Males are more likely to develop Marjolin ulcer.^{6,7} The malignant transition is often extremely delayed, with an average latency period of 15-25 years.⁹ The most prevalent histologic variety is squamous cell carcinoma (SCC); Additional variants include basal cell carcinoma (BCC), angiosarcoma, fibrosarcoma, malignant melanoma, liposarcoma, and osteosarcoma.¹⁰ The process underlying malignant transformation is widely established. Many theories have been discussed in the literature.¹¹ Few ideas suggest that inflammation-induced mutations in wounded tissue promote carcinogenesis.¹² Others claim that a foreign body reaction in the injured tissue leads to malignant transformation.¹³

Few other investigations have found that repeated ulcer damage and long-term chronic irritation, which results in persistent mitotic activity to minimize the defect, eventually leads to carcinogenesis.¹⁴ Patients with congenital immune weaknesses have a higher risk of developing this Carcinoma.¹⁵ Marjolin ulcers are classified into two types: acute and chronic. Acute malignant transformation occurs within one year of damage,¹⁵ whereas chronic transformation occurs over many years of latency. Histological analysis of tissue from the injured site confirms the presence of Marjolin's ulcer.

There are few studies in our country that thoroughly examine the histopathological types of Marjolin ulcers, latency period, and outcome after surgery. As a result, the current study was done to examine the clinicopathological features and treatment

patterns of Marjolin ulcers in patients who were seen at a Major burn center in Bangladesh.

Methods

A retrospective analysis of all cases of Marjolin ulcer from 2020 to 2024 who had presented at the National Institute of Burn and Plastic Surgery, Dhaka, Bangladesh was done. The diagnosis had been confirmed by histopathological examination. Demographic features like age at the time of presentation, gender, latent period between the first damage and development of Marjolin ulcer, anatomic location, tumor grade, histologic type of the tumor, and their outcomes were documented for these patients. All patients had been treated by surgery as the main modality of treatment. After completion of the treatment, all patients were followed up every 3 months with clinical and radiological examination. All details were documented and analyzed. Statistical analysis was done in percentage and frequency. Microsoft Word and Excel were used to create tables and charts.

Results

A total of 92 cases of suspected Marjolin ulcers were identified and included in the study. They were stratified according to age, gender, and anatomic location. The age of the patients studied ranged from 11 to 70 years, with the majority of the patients in the age range of 31 to 40 years (39.13%) followed by 51-60 years (21.74%).(Figure 1)

Among all cases, 65 (70.65%) were male and 27 (29.35%) were female. Most cases are result from flame burn (68.48%) and scald (20.65%). (Figure 2)

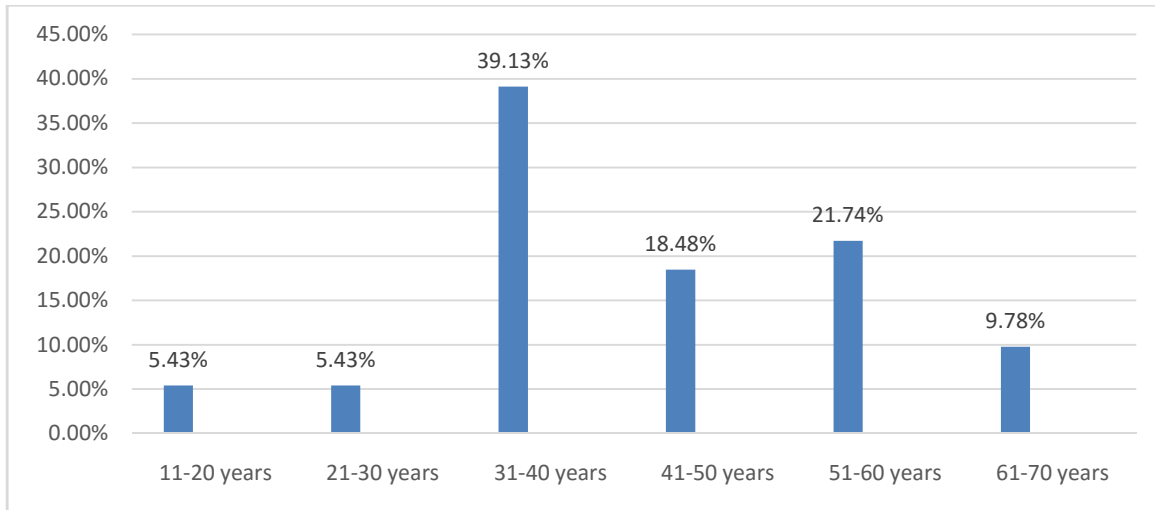


Figure 1. Bar chart showing age ranges of clinically suspected Marjolin ulcer cases (n=92)

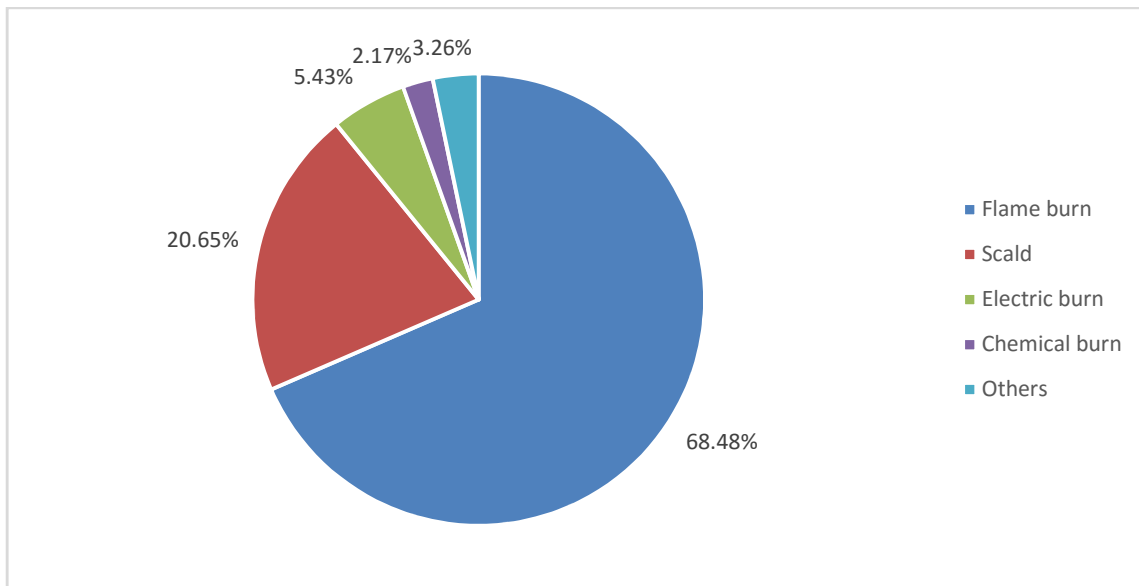


Figure 2. Pie chart showing types of burn in clinically suspected Marjolin ulcer cases (n=92)

Among 92 suspected cases, 48 were diagnosed as true Marjolin ulcer. Most of them are occurred in lower limb (total 26 cases in leg, around knee, thigh and groin) followed by trunk (7 cases). (Table I)

Table I: Distribution of suspected versus true Marjolin ulcer according to anatomical location

Site	Suspected cases (n=92)	True Marjolin ulcer cases (n=48)
Trunk	10	07
Angle of mouth	01	01
Upper limb	07	03
Axilla	02	02
Breast	01	01
Cubital Fossa	04	03
Groin	04	04
Leg	18	08
Popliteal fossa and knee	24	12
Sacral region	02	01
Thigh	05	02
Scalp	10	03
Other sites	04	01
Total	92	48

Histopathological diagnosis showed 47% of total cases are squamous cell carcinoma, 31% are benign ulcers with a few other types of ulcers (Figure: 3).

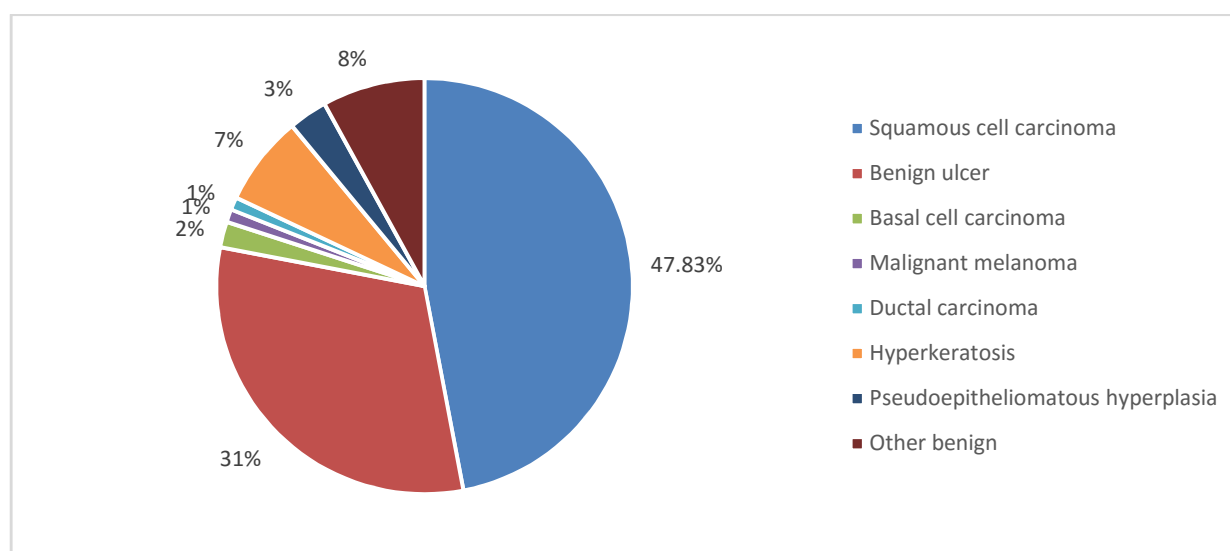


Figure 3. Pie chart showing histopathological diagnosis of suspected Marjolin ulcer (n=92)

Among true marjolin ulcers, 47.83% were SCC, 2.17% were BCC and very few malignant melanoma and ductal carcinoma (Table 2).

Table II: Histopathological diagnosis of Marjolin ulcer (n=48)

Histopathological type	Number	Percentage
Squamous cell carcinoma	44	47.83%
Basal cell carcinoma	02	2.17%
Malignant melanoma	01	1.09%
Ductal carcinoma	01	1.09%
Total	48	100%

Photomicrographs of malignancy are shown in Figure 4. Among 44 SCC, 35 were well differentiated, 7 were moderately differentiated and 2 were poorly differentiated (Figure 5).

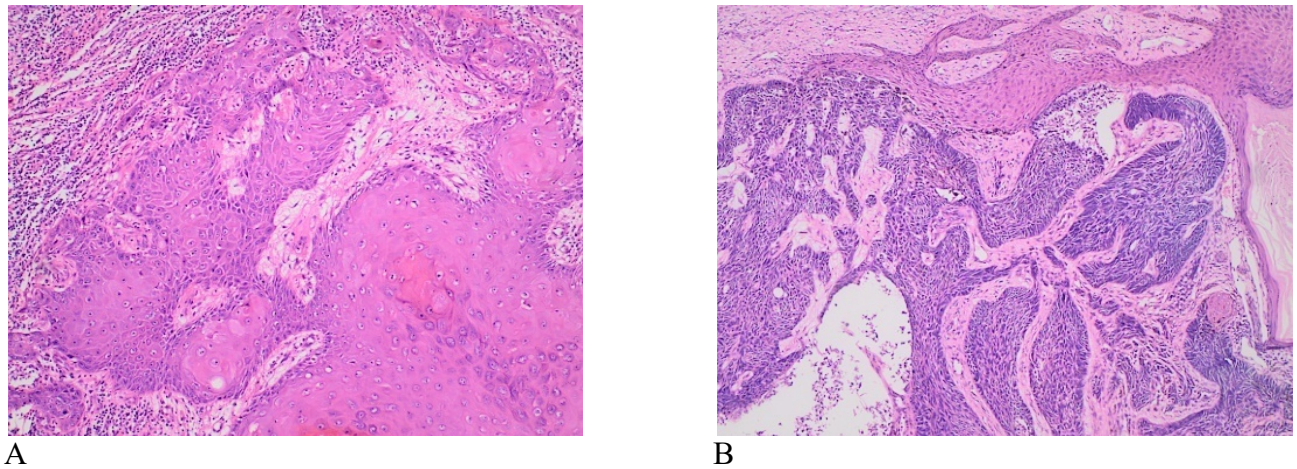


Figure 4. (A) Well-differentiated squamous cell carcinoma (SCC), case no. 30, (B) Basal cell carcinoma (BCC), case no. 51.

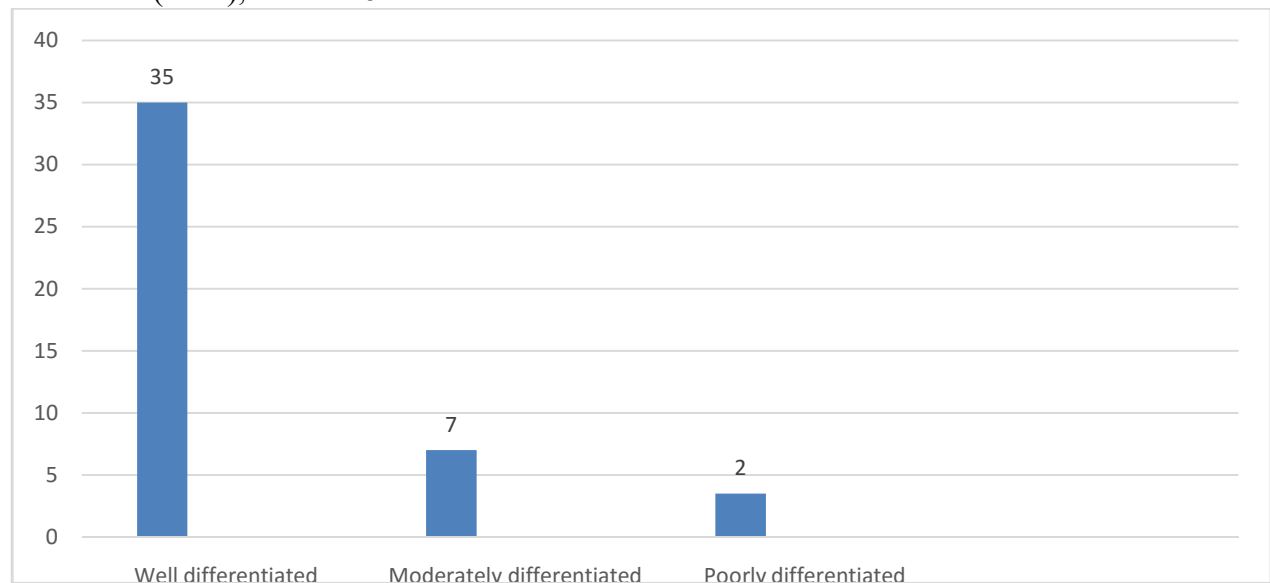


Figure 5. Bar chart showing number of SCCs according to grade (n=44)

Table III shows the latency period before development of ulcer. Most of the cases occurred after 25 years with the second peak ranging from 21-25 years.

Table III: Period of latency after which Marjolin ulcer develops

Period of latency (years)	Number of ulcer
<5	1
5-10	2
11-15	2
16-20	11
21-25	12
>25	20

Follow-up of these patients after 3 months of treatment is shown in Figure 5. Seventeen patients are surviving a disease-free life, eight are sustaining disabilities, recurrence occurred in 6 cases and 3 patients died. We lost 10 patients to include in follow-up.

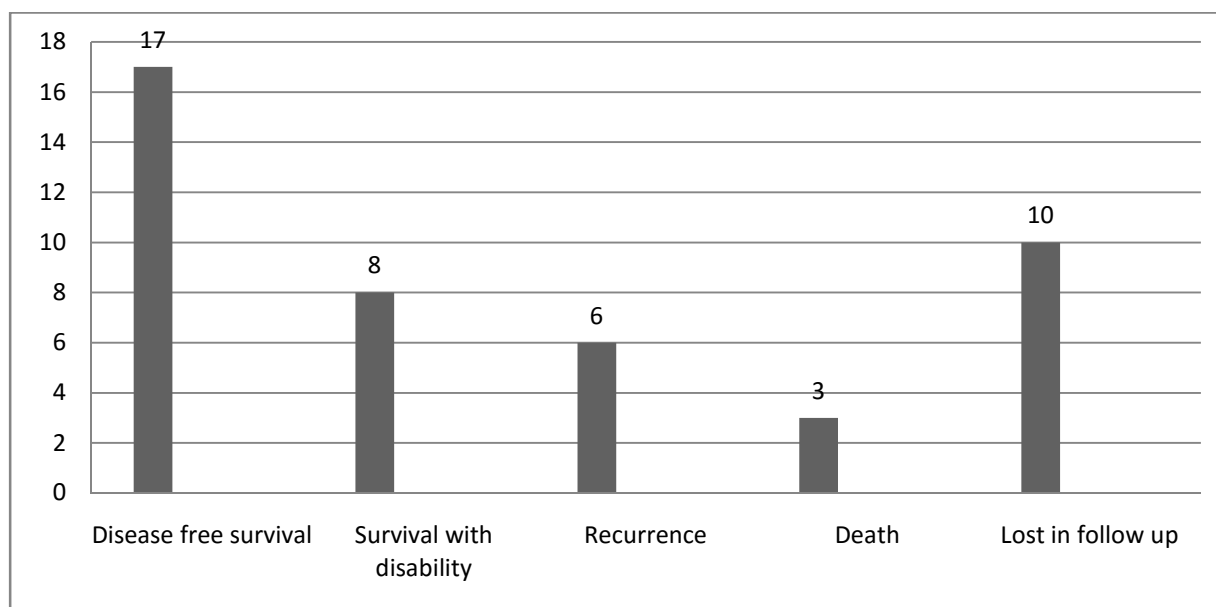


Figure 5. Bar chart showing outcome of patients after treatment at follow-up after 3 months

Discussion

Non-healing ulcers occurring on chronic scars are extremely dangerous due to their malignant transformation potential. As a result, these ulcers should be thoroughly investigated to rule out the possibility of cancer. The clinical profile of both benign and malignant ulcers is similar, albeit minor differences are recognized.^{16,17} As a result, any non-healing ulcer on burns or traumatic scars should be treated as a malignant one unless proven otherwise by histological examination.¹⁸ This retrospective review examined the histological features and consequences of Marjolin ulcers.

The age of the patients was between 31-60 years overall. It was also clearly evident that the incidence of Marjolin ulcer gradually increased with advancing age. Different other studies found the same result.^{19,20,21} We found male preponderance (70.65%) in our study. Das et al., Fahim et al. and Kumar et al. also found male predominance in their study.^{19,20,21}

Initial burn among the malignant cases was flame burn in 68.48% of cases while scald was 20.65%, electric burn was 5.43%, and others in lower percentages. This may be because flame burn cases are more

widespread and result in a much deeper burn, causing more rigid and thick scarring liable to break frequently. Das et al. also found similar results as the initial burn among the malignant cases was flame burn in 80.437% of cases while scald was 10.86%, and contact burn was 6.7%.¹⁹ Fahim et al. and Kumar et al. also found the flame burn as the commonest cause.^{20,21}

The patients had ulcers in different anatomical locations. Among 92 suspected cases, 48 were diagnosed as true Marjolin ulcers. Most of them occurred in the lower limb (26 cases in the leg, around the knee, thigh, and groin) followed by trunk (7 cases). Ten cases in the upper limb and head-neck region. Das et al., 2015 found lower extremity as the most common site (18 cases), followed by upper extremity (14 cases) and trunk (10 cases). Marjolin ulcers have the ability to develop in almost any anatomical location.^{22,23} Therefore, the predominance of lower and upper extremities may be related to the fact that most burns and venous stasis ulcers occur in the arms and legs, and are also exposed to repeated stress. Ozek et al.²⁴ found 57.5% cases of malignant ulcers in the lower extremity. He observed that most carcinomas developed in sites predisposed to repeated trauma, such as joints (62.9%). In their study, the popliteal area was the most commonly involved anatomical site (30%). In this study also popliteal area and knee were involved in 12 cases. Das et al., 2015 found 75% of cases in this area.¹⁹

Out of 92 ulcers, 44 were SCC while 2 cases were BCC, 1 malignant melanoma, and 1 ductal carcinoma. Other previous studies on Marjolin ulcers have found a predominance of SCC, but other types were also reported. Nthumba¹² also found maximum representation of SCC (97.5%) in his large African study. Aydogdu et al.²⁵ also mentioned that most burn scar carcinomas are of squamous cell

type (75–96%). Fahim et al. and Kumar et al. observed the same results.^{20,21}

The latent period of most cases of Marjolin ulcers was more than 25 years. Other studies also demonstrated a longer latency period like this.^{19,20,21} Many previous studies reported the latent period of Marjolin ulcer.^{26-28,16,17,30} Some studies reported very small latent periods; for example, 7 months, 3 months, or even 6 weeks.³⁻⁵ These are categorized under the acute Marjolin's ulcer group.^{27,28,30} Variations in the latency period may occur from some contributing factors, such as environmental factors, immunological status, age of the patient, age at the primary insult, and genetic difference.

All the SCCs found in the present study were highly differentiated. In this study, among 44 squamous cell carcinomas, 35 were well differentiated, 7 were moderately differentiated and 2 were poorly differentiated. Ozek et al.²⁴ included only SCC in their study of 40 cases and found that 90% had Grades I and II differentiation. The degree of differentiation is also important as the risk of metastasis highly correlates with the degree of differentiation. Fahim et al. found, that out of these 19 cases; 14 (73.68%) were well-differentiated, three (15.78%) were moderately differentiated, and two (10.52%) were poorly differentiated SCC.²⁰

This study observed 6 cases of recurrence within 3 months of excision. Das et al. observed six cases of recurrence within 6 months of excision.¹⁹

The limitation of the study is, that it was a single-centered study. Long-term multicenter studies with a large number of patients will be more conclusive in identifying the most frequent clinical presentations as well as confirming the presence of malignancies in Marjolin ulcer cases.

Conclusion

In conclusion, the present retrospective study indicated that Marjolin ulcer mainly occurred in males and was mainly scar carcinoma after a flame burn. Most of the cases had a longer latent period. The pathological type was mainly squamous cell carcinoma.

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