The Professional Medical Journal
www.theprofesional.com

DOI: 10.29309/TPMJ/18.4568

ORIGINAL PROF-4568

MARJOLIN'S ULCER AND BURN SCARS;
A PREVENTABLE ASSOCIATION.

Hyder Ali[1], Yusra Afzal[2], Syfyan Ahmed[3], Mujtuba Pervaiz[4], Masood Hussain Rao[5], Syed Muhammad Ali[6]

1. MBBS, FCPS (Plastic Surgery)
Assistant Professor
Department of Plastic & Reconstructive Surgery,
Dow University of Health Sciences & Dr Ruth KM Pfau, Civil Hospital Karachi, Pakistan.
2. MBBS, FCPS (Plastic Surgery)
Assistant Professor
Department of Surgery & Allied,
Jinnah Medical & Dental College and Hospital, Karachi, Pakistan.
3. FCPS (Oral & Maxillofacial Surgery)
Assistant Professor
Department of Oral and Maxillofacial Surgery, Karachi Medical & Dental College, Abbasi Shaheed Hospital, Karachi.
4. MBBS
Resident
Department of Plastic & Reconstructive Surgery,
Dow University of Health Sciences & Civil Hospital Karachi, Pakistan.
5. MSc, PGDBA
Principal Research Officer,
Dow University of Health Sciences, Karachi, Pakistan.
6. BDS
Resident
Department of Oral and Maxillofacial Surgery, Karachi Medical and Dental College, Abbasi Shaheed Hospital, Karachi, Pakistan.

Correspondence Address:
Dr. Hyder Ali,
Assistant Professor &
Consultant Plastic Surgeon,
Dow University of Health Sciences & Civil Hospital Karachi, Pakistan
haider.450@hotmail.com

Article received on:
08/12/2017
Accepted for publication:
20/02/2018
Received after proof reading:
02/06/2018

ABSTRACT... Background: Marjolin's ulcer (MU) represents malignant degeneration that typically ensues over a period of time in the post-burned lesions and scars or any other chronic wound. The worldwide incidence of MUs in such lesions is reported to be 0.77%-2%. **Objectives:** To determine the frequency of malignancy in post burn scars. **Study Design:** Descriptive, cross sectional**. Place & Setting:** Department of Plastic & Reconstructive Surgery, Dow University of Health Sciences & Dr Ruth KM Pfau Civil Hospital Karachi. **Duration:** December 2014 to November 2017. **Materials & Methods:** A selection criterion was defined and via non probability consecutive sampling. **Sample Size:** 80 patients. **Results:** The mean age of the patients was 48.6 ± 9.2years with range (30 to 60 years). The mean duration of scars was found in our study to be 20.4+5.1 years. Out of 80 patients, 33 (41%) were male and 47 (59%) were female. Malignancy was recorded in 66(82.5%) patients with post burn scar. The most common type of malignancy was squamous cell carcinoma in 27 patients (33%). **Conclusion:** A high index of suspicion is required when dealing with chronic non-healing ulcers. In our environment early recognition and aggressive treatment of Marjolin's ulcers and close follow-up are vital for prevention and also to improve outcome.

Key words: Marjolin's Ulcer, Malignant Degeneration, Post-Burn Scars.

Article Citation: Ali H, Afzal Y, Ahmed S, Pervaiz M, Rao MH, Ali SM. Marjolin's ulcer and burn scars; a preventable association. Professional Med J 2018; 25(6):799-804. **DOI:**10.29309/TPMJ/18.4568

INTRODUCTION

Malignant transformation occurring in any scar tissue is known as Marjolin's ulcer. The term was named after French surgeon, Jean-Nicolas Marjolin, who first described the condition in 1828.[1,2] The term was later coined by J C De Costa. Most cases of Marjolin's ulcer reported so far occur in post-burn scars but not all ulcers that occur in post-burn scar are malignant. The majority are seen in primary burn scar sites with few reported cases following secondary graft placement.

Malignant degeneration of post-burned lesions and scars is more or less inevitable, afflicting at least 0.77%-2% of the full thickness burns that have healed by secondary intention, those which never healed completely and the unstable post-burn scars that frequently ulcerate due to trivial traumatic insults.[3]

The term "Marjolin's ulcer" is used collectively to describe Squamous cell carcinoma (SCC), basal cell carcinoma (BCC), malignant melanoma, and mesenchymaltumours; however, the most common type of histology seen is well-differentiated SCC. Burn scar carcinomas usually present as flat ulcerated lesions with elevated margins and surrounding induration.[4]

Patients present in a bimodal distribution with acute and chronic types. Acute is defined as a malignancy that occurs within 12 months of the original injury and usually manifests as basal cell

carcinoma. The shortest time interval reported in the literature between injury and histological confirmation of malignancy is 4 to 6 weeks. The chronic type is much more common overall, as the malignancy tends to develop very slowly, with an average time for malignant transformation of 35 years.

MATERIALS AND METHODS

Setting & Place

Department of Plastic & Reconstructive Surgery, Dow University of Health Sciences & Dr Ruth KM Pfau Civil Hospital Karachi.

Duration

December 2014 to November 2017.

Inclusion Criteria

All the patients attending Department of Plastic & Reconstructive Surgery, with confirmed diagnosis of Marjolin's ulcers, having age between 30-60 years with post burn scars of more than one year and had not healed after one year of medication treatment; were enrolled for the study.

Exclusion Criteria

Patients having history of radiation, post-surgical/ post traumatic scars or having any pathology were excluded from the study.

Before collection of data a written and informed consent was taken from all the selected patients. The participants were ensured that their information was used for only study purpose and patient confidentiality was ensured. The data was collected on different aspects including demographics. Complete history from the patients demonstrating changes in post burn scars was elucidated. Radiological investigations were performed to rule out any distant metastasis and histological analysis was done to determine the type of malignancy in post burn scares.

Statistical Analysis

The collected data was entered and analyzed through SPSS version 21.0. Frequency and percentage was computed for categorical variables like gender, etiology of burn, presence and absence of malignancy and type of malignant tumor. Mean with standard deviation was used to describe numerical variable like age, BMI and duration of scar. Stratification with respect to age, BMI, gender, etiology of burn, income level, educational status, duration of scar and type of tumor was done to see the effect of these on outcome variable. Post stratification chi-square test was applied and $P<0.05$ was taken as significant.

RESULTS

During the study period, 80 patients fulfilling the inclusion criteria were enrolled in our study. According to the analysis of the data, mean age of the patients was 48.6 ± 9.2 years having range (30 to 60 years). Out of these 80 patients, 33(41%) were male and 47(59%) were female. Regarding education status of these patients, 14(17.5%) were illiterate, 35(43.7%) had primary education, 15(18.8%) had secondary education, 13(16%) were intermediate and 3(4%) were graduate. Similarly, majority 51 (64%) of them had monthly income less than equal to rupees 20000, whereas 22(27.5%) had monthly income between rupees 21000-50000 and7 (8.5%) had monthly income greater than rupees 50000.

Regarding clinical assessment, the mean BMI of these patients was 30.7±5.7. The mean duration of scar was found 20.4± 5.1 years.

Regarding causative previous lesions, patients who presented with burn wounds were included in this study. A higher prevalence was found of thermal burn patients 51(64%), followed by electric 23(28.5%), and chemical 06(7.5%).

Histopathological analysis was performed which showed that out of 80 patients with post burn scar, 66(82.5%) had malignancy. The prevalence of cancer encountered was squamous cell carcinoma in 27(41%) subjects, followed by basal cell carcinoma 17(26%), melanoma 7(10.5%), sarcoma 6(9%), SCC-melanoma 6(9%) and squamous-basal 3(4.5%).

When outcome variable was stratified with respect to age, gender, BMI, educational status no significant difference was observed.

Variables	Frequency	Percentage
Age		
30-45 years	53	66.3%
46-60 years	27	33.7%
Gender		
Male	33	41.0%
Females	47	59.0%
Education		
1. Illiterate	14	17.5%
2. Primary	35	43.7%
3. Secondary	15	18.8%
4. Intermediate	13	16.0%
5. Graduate and above	3	4.0%
Income		
1. <Rs.20,000	51	64%
2. Rs, 20,001-50,000	22	27.5%
3. Rs. 50,001 +	7	8.5%
BMI (mean ± Standard deviation)	30.7 ± 5.7	

Table-I. Demographic characteristic of the patients with etiology of burn with malignancy status.

Variables	Frequency	Percentage
Duration of scar		
≤ 15 years	15	18.8%
>15years	65	81.2%
Etiology of burn		
1. Thermal	51	64.0%
2. Electrical	23	28.5%
3. Chemical	06	07.5%
Frequency of malignancy in post burn scar		
Yes	66	82.5%
No	14	17.5%
Types of malignancy in post burn scars		
1. Squamous cell carcinoma	27	41.0%
2. Basal cell carcinoma	17	26.0%
3. Melanoma	07	10.5%
4. Sarcoma	06	09.0%
5. SCC- Melanoma	06	09.0%
6. SCC -BCC	03	04.5%

Table-II. Patient's etiology of burn with malignancy status.

Variable	Malignancy		P-Value
	Yes	No	
Age Group			
30-45 years	41	12	0.029
46-60 years	25	02	
Gender			
Male	27	06	0.893
Female	39	08	
Etiology of Burn			
1. Thermal	46	05	0.002
2. Electrical	18	05	
3. chemical	02	04	
Duration of Scar			
≤ 15 years	04	11	0.000
>15years	62	03	

Table-III. Correlation of malignancy with other factors:

Figure-1. Pictures of various patients with different sites of burn scars who developed Marjolin's ulcer. (A) Right forearm MU secondary to flame burn in a 55 year old female patient. (B) MU left foot in a 41 year old male who had flame burns at age 20.(C) MU over the chest in a 45 year old woman who had scald burns at the age of 13.(D) MU over the right dorsum of hand in a 49 year old woman who suffered burns due to hot liquid 3 years ago.(E) 53 year old female patient who had flame burn at age 21 with biopsy proven squamous cell. (F) MU in a 35 year old male who had scald burns to the left leg at age 6. (G) MU over the right thigh in a 43 year old woman who suffered burns due to hot liquid 3 years ago (H) squamous cell carcinoma in the right leg of a 36 year old male who sustained flame burns 7 years ago.

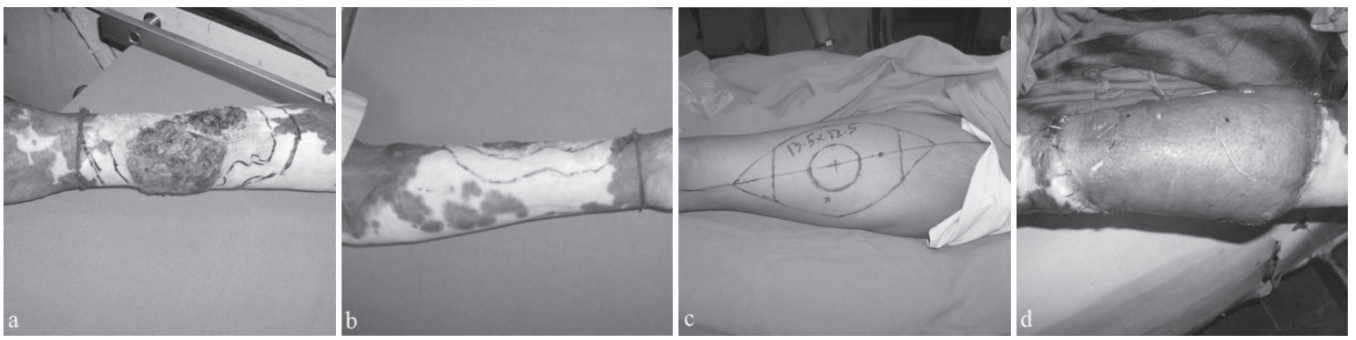


Figure-2. (a) 46 years old male with MU left forearm, biopsy proven SCC (b) margins marked for excision (c) Size and perforator marking on the left thigh for anterolateral thigh flap (ALTF) (d) ALTF applied after excision of SCC.

DISCUSSION

In a study, an increased rate of spontaneous mutations due to prolonged inflammation and repetitive healing attempts has been proposed.[7] It has also been hypothesized in the same study that in epithelium of chronic ulcers, there may be a deficiency of innate immunological cells (natural killer cells) that normally counter malignancy. Abnormal cells can then evade immune-surveillance, increasing the risk of metastasis.[7]

The standard treatment for MU is local excision with wide margins; however, there is no clear consensus for resection margins. In the literature, 2–4 cm resection margins are suggested.[8,9] One author found a very low recurrence rate when 3–5 cm margins were used.[10,11] Additionally, adjuvant chemo-radiation therapy can be used in cases of widespread metastasis. However, we have not assessed the same in our study.

According to a study, MU's are most commonly

squamous cell carcinoma (SCC) (75-95%).[12,13] it was found to be 41% patients selected for this study. The lower figure in our study is due to the reason that they count basal cell carcinoma, melanoma and sarcoma in it.

Similarly, in a study it was reported that the metastatic rate in MU was 27.5% but due to poor prognosis in pressure sore, it reported as high as 61%. In our study where the situation is much worse and normally people are not consulting their physicians, in the histopathological analysis of the post burn scar patients, the malignancy was reported to be 82.5%.

CONCLUSION

There exists an important association between chronic burn scars and malignancy. Biopsy should be done for any acute or chronic non-healing wound and send for histopathology examination to ensure that it does bear ominous tidings. Crucial steps in prevention of these lesions are wound care and early detection.

ACKNOWLEDGEMENTS

The authors would like to thanks The Department of Plastic & Reconstructive Surgery at Dow University of Health Sciences & Dr Ruth KM Pfau Civil Hospital, Karachi, The Department of Surgery & Allied Jinnah Medical & Dental College and Hospital, Karachi, and Department of Oral and Maxillofacial Surgery Karachi Medical and Dental College Karachi for their general support.

Conflict of Interest

All surgeries were performed at Dr Ruth KM Pfau Civil Hospital Karachi where treatment is provided free of cost.

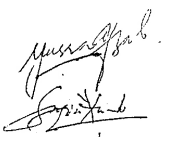
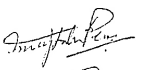
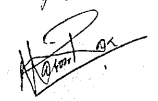
REFERENCES

1. Sabin SR, Goldstein G, Rosenthal HG, Haynes KK. **Aggressive squamous cell carcinoma originating as a Marjolin's ulcer.** Dermatologic Surgery. 2004; 10:229–30.
2. *Chong AJ, Klein MB (March 2005).* ***"Images in clinical medicine. Marjolin's ulcer".*** *N. Engl. J. Med. 352 (10): 9e.*
3. Copcu E. **Marjolin's ulcer: A preventable complication of burns Plast Reconstr Surg.** 2009; 124: 156–64e.
4. Chang JB, Kung TA, Cederna PS. **Acute Marjolin's ulcers: A nebulous diagnosis.** Ann Plast Surg.2014; 72(5):515–20.
5. Kweon HJ, Shin HC, Kim DS, Kim SW. **Squamous cell carcinoma arising from chronic ulcerative lesion in a patient with disabling panscleroticmorphea.** Ann Dermatol. 1994; 6:81–5.
6. Fairbairn NH, Hamilton SA. **Management of Marjolin's ulcer in a chronic pressure sore secondary to paraplegia: A radical surgical solution.** Int Wound J. 2011; 8(5):533–6.
7. Baliarsing AS. **Will Fas gene help to diagnose burn scar squamous cell carcinoma** Plast Reconstr Surg2001; 108:575.
8. Iqbal FM, Sinha Y, Jaffe W. **Marjolin's ulcer: A rare entity with a call for early diagnosis.** BMJ Case Rep.2015; 2015: bcr2014208176.
9. Khan K, Giannone AL, Mehrabi E, Khan A, Giannone RE. **Marjolin's ulcer, complicating a pressure sore: The Clock is ticking.** Am J Case Rep. 2016; 17:111-4.
10. Bozkurt M, Kapi E, Kuvat SV, Ozekinci S. **Current concepts in the management of Marjolin's ulcers: Outcomes from a standardized treatment protocol in 16 cases.** J Burn Care Res. 2010; 31(5):776–80.
11. Kero-valentic MI, Samiin K, Rohlan BH, et, al. **Marjolin's ulcers: Modern analysis of an ancient problem,** Plastic Reconstr Surg, 2009; 123(1): 184-91.
12. Hatzis GP, Finn R, **Marjolin's ulcers: A review of the literature and report of a unique patient treated with a CO_2 laser.** J Oral Maxillofac Surg, 2007; 65(10):2099-105.
13. Khan K, Giannone AL, Mehrabi E, Khan A, Giannone RE. **Marjolin's ulcer complicating a pressure sore: The clock is ticking.** Am J Case Rep. 2016; 17:111-4.

Those who follow the crowd usually get lost in it.

– Unknown –

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Hyder Ali	Chief Plastic Surgeon involved in performing all surgeries, postoperative follow-up of patients, final approval of the manuscript and responsible for accuracy and integrity of results. Critical review of manuscript.	
2	Yusra Afzal	Critical review of manuscript.	
3	Syfyan Ahmed	Critical review of manuscript.	
4	Mujtuba Pervaiz	Postoperative care & follow-up of patient.	
5	Masood Hussain Rao	Rewriting the whole manuscript, developing new formatting of tables and resutls.	
6	Syed Muhammad Ali	Reviewing the manuscript, technical support for correcting plagiarism and structure.