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Case Report

A rare presentation of Marjolin ulcer in burn scar in popliteal fossa

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Abstract

The squamous cell carcinoma in a long-standing chronic scar is a well-known clinical entity. Such lesions are also called Marjolin's ulcer (MU). Marjolin's ulcer can form following any trauma, unattended wounds, but most commonly burn scars which were left ungrafted. In this case report, we present a case of Marjolin's ulcer with an unusual clinical presentation. A patient was referred to the Department of plastic surgery due to flexion deformity of his right knee and associated chronic unattended scar. The biopsy suggested well differentiated squamous cell carcinoma. Thereafter, wide local excision and split skin grafting (SSG) was done. This case is unique in terms of its usual presentation and long latency of around 45 years.

Keywords: Marjolin's ulcer, Chronic scar, Squamous cell carcinoma, Split skin grafting, Burn scars.

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1. Introduction

Marjolin's ulcer is a clinical subtype of squamous cell carcinoma which is known for its aggressive behavior.[1] Marjolin's ulcer is a malignant skin condition that develops in persistent, non-healing wounds.[2] Most of these lesions have been known to develop in burn scars,[1] Marjolin's ulcer begins with an initial injury, leading to a persistent or recurring non-healing wound. These are more common in males, with the lower extremities being the most frequently affected area.[3] It is crucial to identify symptoms suggesting the malignant transformation of persistent wounds. Early recognition by clinicians is important for timely diagnosis and surgical intervention, enhancing the overall survival rate of patients.[1]

2. Clinical Case

A 59 year old male presented to the department of Plastic surgery after being referred from Urology department. The patient had left ureteric calculus for which ureteric stenting was planned. This procedure requires patient to be positioned in lithotomy position. However, there was difficulty in positioning of the patient for the procedure. Patient was advised to take treatment for his flexion deformity of right knee and an associated unstable scar.

Patient had a history of thermal burns about 45 years ago over his right popliteal fossa, for which no particular surgical and medical treatment was taken. Over the years, patient had developed an unstable scar which occasionally bled. As a consequence, patient developed flexion deformity of right knee with restricted range of motion.

On examination, the patient had an unstable scar over right popliteal fossa with flexion contracture, limiting the range of motion of knee joint. The scar also had an ulcer which measured 8x7 cm with everted margins and punched out edges. Inguinal lymph nodes were not palpable. Upon radiological investigations, X-ray of Knee joint revealed that joint space and bones were normal. Chest x-ray was found to be normal. Patient was planned for Ulcer edge biopsy and contracture release. Biopsy was sent for Histopathology. Histopathology report suggested Squamous cell carcinoma.

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18 Fluoro-deoxy-glucose Positron emission tomography (FDG-PET) findings showed no local, lymphatic or distant spread. Thereafter, wide local excision with 2cm margins was performed. Underlying neurovascular bundle and joint was not exposed. Wound closure was done with split skin grafting. Donor site of skin graft was left calf in postoperative period, skin graft settled well and would healed unremarkably.

In Histopathological examination, a tumour composed of polygonal cells arranged in nests and sheets with prominent intercellular bridges and intracellular keratinization is noted. The cells have moderate amount of glassy eosinophilic cytoplasm and large nuclei with unevenly distributed coarse chromatin and prominent one to multiple nucleoli. Many keratin pearls seen. The stroma shows infiltration of tumour cells and mixed inflammatory cell infiltration composed of predominantly neutrophils. Thick collagenous bands were noticed in tumour bed, indicating its origin in a chronic scar. Margins of specimen were found to be free of tumour. Final impression of well differentiated squamous cell carcinoma was given.

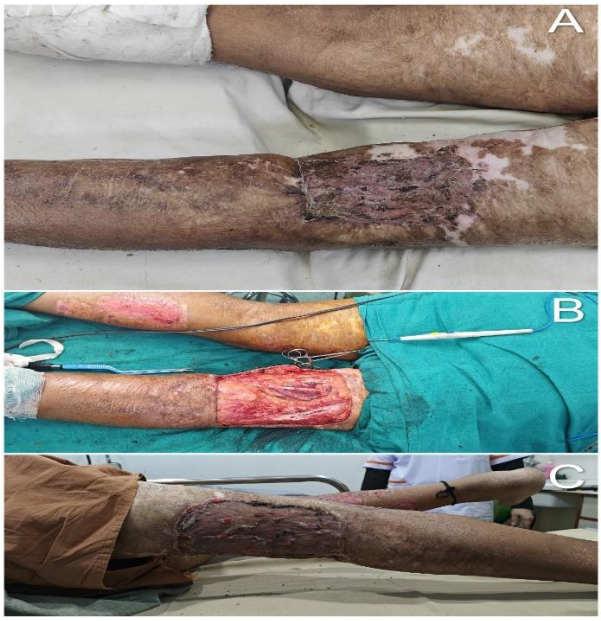

Figure 1: A): Preoperative image showing burn scar with marjolin's ulcer over right popliteal fossa; **B):** Intraoperative image showing wide local excision of burn scar with Marjolin Ulcer; **C):** Postoperative image showing healed graft wound

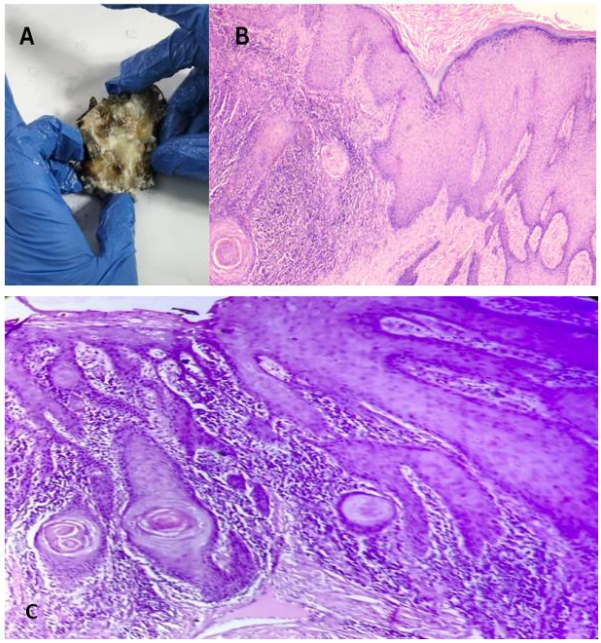

Figure 2: A): Shows an ulceroproliferative growth on skin; **B**): Shows normal epithelium towards right lower side transitioning into dysplastic and malignant epithelium infiltrating into deeper tissue; C): Shows malignant epithelial cells forming nests and infiltrating into deeper tissue

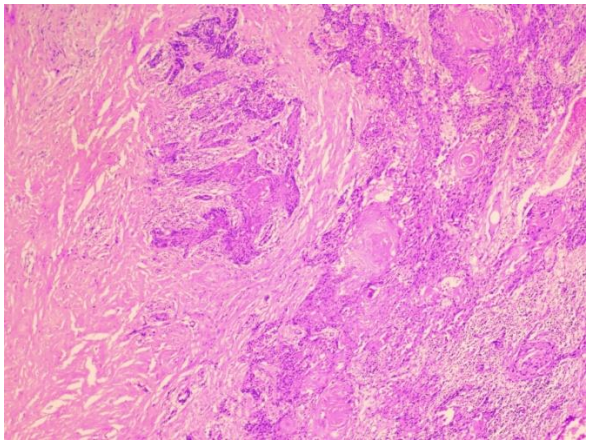

Figure 3: Image of the deeper part of the scar showing infiltration of dysplastic squamous tumour cells into eosinophilic collagenized stroma of the scar tissue

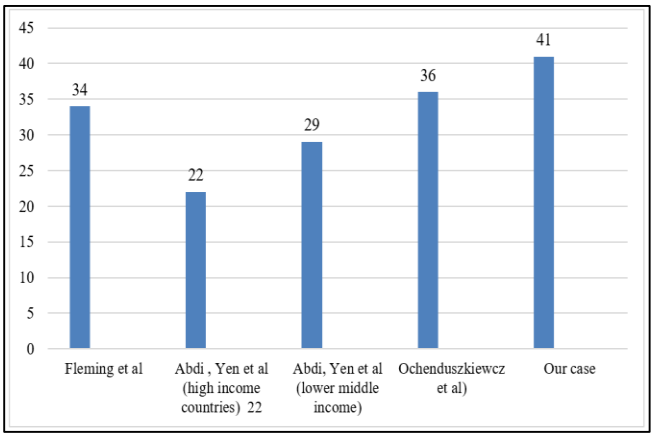

Figure 4: Shows comparison of latency period after initial injury to development of Marjolin's ulcer in years according to various studies. X axis mentions name of the study and Y axis shows latency period in years. Our case showed higher latency period than other studies

3. Discussion

Malignant changes in chronic scar were first seen by Celsus in first century AD. After that, in 1828, Jean Nicholas Marjolin reported neoplastic changes in chronic scar. However he never named such scars as 'Marjolin's Ulcer '. But further contribution by Behcet, Duypuytrens, Trevews and Pack, Robert Smith and finally Da Costa sho solidified the eponym in 1903.[4] Marjolins Ulcer classically refers to the squamous cell carcinomas developing in a long standing chronic burn scar. However, controversy exists as many authors claim it to take origin from other etiologies like osteomyelitic fistula, venous in sufficiency ulcers etc. whereas some scholars describe other types of malignancies as well (basal cell carcinoma, sarcoma etc).[5] According to Treves and Pack, incidence of MUs in lower limb is 38%. Male to female ratio is 3:1.[6] Mostly, MUs have indolent course due to fibrous scar which limit the local and lymphatic spread of the disease. However, once it infiltrates the scar tissue it can easily metastasise to lymph node groups and distant metastasis.[7]

Our case presented with well differentiated squamous cell carcinoma. Marjolin's ulcers can manifest at any age and across all ethnicities, with men being more susceptible than women.[1] Our case was also a middle aged Male. The interval between the initial injury and cancer development is usually extended. Such malignant transformation can be prevented if wound is covered with Skin graft or flap at the initial presentation.[1] Our case presented after about 41 years of Initial burn injury.

Various theories have been suggested proposing the pathophysiology of Marjolin's ulcer, however a definitive consensus is yet to be achieved. It is believed that it is a complex process influenced by both genetic and environmental factors.[2] Various factors like reduced blood supply and compromised epithelial integrity lead to increased vulnerability to wound chronicity and developing malignant change have been proposed since 1930s. Persistent irritation and repeated injury in this undernourished area accelerate degenerative alterations. Moreover, the absence of organized collagen and compromised vascular supply in wounds, caused by fibrosis, weakens the formation of new epithelium and undermines the existing immune system, contributing to the risk of developing cancerous change in such lesions.[3] This notion is reinforced by Virchow's hypothesis linking chronic irritation to development of carcinomas. Additionally, an elevated incidence of spontaneous mutations due to prolonged inflammation and recurrent healing efforts are also believed to contribute to the process.[2]

On molecular level, Squamous cell carcinoma follows a "two-hit" model, requiring two mutations in the p53 tumour suppressor gene for malignant transformation. Additionally In Marjolin`s ulcer, there may be a deficiency of natural killer cells in chronic ulcer epithelium, allowing neoplastic cells to evade immune surveillance, increasing risk of developing cancer. Marjolin`s ulcers in burn scars often show mutations in the FasR (CD95) gene, leading to uncontrolled cellular proliferation.[2] Scar tissue formation post-burn can impair immune surveillance by obliterating lymphatics. This allows tumours to grow larger before penetrating the burn-scar barrier. However, burn scars mainly accelerate tumour progression in existing neoplastic cells rather than initiating new neoplastic development, known as the co-carcinogen theory. The grading of tumour is as follows. Grade 1 – more than 75% of cells are dffierentiated. Grade 2 – 25% to 75% of cells are differentiated. Grade 3 with less than 25% differentiated cells have worst prognosis.[5]

Wide local excision with coverage procedure is first line surgery for marjolin ulcers. Moh's microsurgical excision is the gold standard. But it is not available universally. Practically, 2 cm margins of normal looking skin should be excised. Skin graft is usually done for coverage of wound. Other options are locoregional flaps and microvascular free flaps Amputation of limb is required if major neurovascular pedicle of limb or bone is involved.[8] The management of lymph node is highly controversial. In most of the studies, if lymph nodes are significantly palpable, lymph node dissection is done. In non-palpable lymph nodes, sentinel lymph node mapping or imaging can be done.[9] In our case, we did a 18 FDG PET scan which did not show any lymph nodal involvement. Radiotherapy is indicated in patients with inoperable nodal metastasis, or with positive lymph nodes after node dissection plus any of the following (1) high-grade lesions, (2) tumours >10cm in diameter or (3) lesions arising in the head and neck.[10]

Most studies have reported recurrence of disease in around 20-50 % of cases. Patient with high risk of recurrence included (1) younger age group (2) lymph nodal involvement, (3) those who underwent reconstructive procedure with disturbed wound healing.[10,11]

4. Conclusion

In the end, we would like to summarize that MUs is a rare malignancy which arise in chronic non healing wounds especially burn scars. It is a preventable and often misdiagnosed entity. It can be detected early with high clinical suspicion. MUs usually have indolent course but can also become highly malignant. There are many theories formulated about its course but no single study is widely accepted. A chronic non healing wound should always be biopsied. Multiple biopsies are sometimes done to arrive at a diagnosis. Histological analysis and clinical suspicion are gold standard diagnostic modalities. Once diagnosed, lymph nodal involvement should be confirmed. Wide local excision with Split skin grafting is first line treatment. In delayed diagnosis, malignancy can spread to deeper structures like bone and vessels necessitating the amputation of the limb. Hence, health care provider should be well aware about MUs and take biopsy in all chronic non healing wound to exclude Marjolins ulcer. Recurrence rate is variable and considered as highly recurrent is lymph nodal involvement is there. Radiotherapy is done post-operatively if there is lymph node involvement.

5. Source of Funding

None.

6. Conflict of Interest

None.

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