Annals of Case Reports and Clinical Studies
Case Report (ISSN: 2834-5673)

Aggressive Invasive Cutaneous Squamous Cell Carcinoma of The Trunk in A Veteran: A Case Report and Expert Opinion on Plastic Reconstructive Surgery

Manuel De La Cruz Seoane M.D.[1], Sahar S. Abdelmoneim, M.D, M.B.A[1*], Gustavo Huaman M.D.[2], Filip Babnic M.D.[3], Mona Rizeq M.D. [3], Dariex Rodriguez M.D[1]., Ricardo Castrellon M.D.[2], Odalys P Frontela, M.D. [1]

[1] From the Division of Internal Medicine, Larkin Palm Spring Community Hospital, Hialeah, Florida;

[2] From the Division of Plastic and Reconstructive Surgery, Larkin Palm Spring Community Hospital, Hialeah, Florida and

[3] From the Division of Internal Medicine , Grand Junction VA Medical Center. Grand Junction, CO

Citation: *Manuel De La Cruz Seoane, Sahar S. Abdelmoneim, Gustavo Huaman, Filip Babnic, Mona Rizeq, Dariex Rodreiguez, et al. Aggressive Invasive Cutaneous Squamous Cell Carcinoma of The Trunk in A Veteran: A Case Report and Expert Opinion on Plastic Reconstructive Surgery. Ann Case Rep Clin Stud. 2024;3(1):1-2.*

Received Date: 09 April, 2024; **Accepted Date:** 28 April, 2024; **Published Date:** 05 May, 2024

[*]**Corresponding author:** Sahar S. Abdelmoneim, M.D, M.B.A, From the Division of Internal Medicine, Larkin Palm Spring Community Hospital, Hialeah, Florida

ABSTRACT

We here present a 56-year-old retired Veteran Caucasian man who fought in the Korean War but with an unclear history of Agent Orange exposure, presenting with a one-year history of progressively enlarging lesion on his trunk that was neglected to the extent of progressing to be a large, extensive, deep, non-healing wound extending into the fascia with exposed ribs and spinous processes. Pathological examination showed an invasive cutaneous squamous cell carcinoma (cSCC) composed of malignant cells with basaloid features and squamous differentiation with associated necrosis, acute inflammation, and osteomyelitis. The patient was successfully treated with immunotherapy (Cemiplimab) targeting PD-1.

BACKGROUND

Cutaneous squamous cell carcinoma (cSCC) is the second most common non-melanoma skin cancer (NMSC). Veterans are specifically at an increased incidence of NMSCs compared to the general population. This difference

is likely due to the exposure to Agent Orange (herbicide), which was used in the Korean War. Cemiplimab is a fully human monoclonal antibody immunotherapy that inhibits programmed cell death protein-1 (PD-1), approved for the treatment of locally advanced squamous cell carcinoma, or metastatic squamous cell carcinoma, in patients not eligible for curative surgery or radiotherapy. We here present a 56-year-old retired veteran Caucasian man who fought in the Korean War but has an unclear history of Agent Orange exposure, presenting with the diagnosis of invasive cSCC. The patient was successfully treated with immunotherapy (Cemiplimab) targeting PD-1. The patient presented in this case report gave informed consent to use photos and images for media publication.

CASE REPORT

We present an unusual, rare case of a 56-year-old Caucasian man who was a retired veteran who fought in the Korean War with an unclear history of Agent Orange exposure, is a current tobacco user (smoking and chewing), has no other significant past medical or surgical history, and is not on any medications. The patient presented to the emergency department with a one-year history of progressively enlarging lesions on his back that he neglected and did not seek any medical advice. The lesion progressively grew over the course of one year.The patient denied any itching or bleeding from the lesion. He also denied any fever, chills, or any other symptoms of infection or weight loss. The only associated symptom was fatigue. There was no history of burns, surgical resection of any lesions, or radiotherapy. Family history was negative for skin malignancy. On physical examination, generally, the patient was alert and oriented at times three, pale, and vital signs were unremarkable. Cardiovascular, abdominal, and neurological examinations were all normal. Skin examination (Figure 1) showed a large, extensive, deep, non-healing wound (20 cm vertically x 26 cm horizontally) on the left midback that goes from the midline towards the left flank, extending into the fascia with exposed ribs and spinous processes. The lesion is fixed to the underlying bone with everted, indurated margins and granulation tissue covering the base. There was no significant bleeding or oozing from the wound.

Laboratory tests were significant for leukocytosis. Magnetic resonance imaging (MRI) of the thoracic spine (Figure 2) showed cutaneous or subcutaneous ulceration of the lower back, behind the lower portion of the thoracic vertebrae (T10), down to the top of the lumbar vertebrae (L1). There is an associated thick ring of enhancing soft tissue extending to the adjacent spinous processes of T10, T11, and T12, with evidence of destruction of the posterior aspect of the T11 and T12 spinous processes and possibly the tip of the spinous processes of T9 and T10.

There was also evidence of marrow edema and pathologic enhancement of the bilateral laminae and left transverse process, and partial visualization of abnormal enhancement of the posterior aspect of the left 9th, 10th, and 11th ribs was noted. Tumor invasion of the posterior aspect of T 9–T 12 vertebrae was a differential. There was no evidence of abnormal fluid collection or soft tissue mass in the epidural space at the thoracic level. The thoracic spinal cord and conus medullaris were also unremarkable on MRI. A soft tissue and bone biopsy were performed. Pathology showed an invasive carcinoma composed of malignant cells with basaloid features and squamous differentiation with associated necrosis, acute inflammation, and osteomyelitis (Figure 3). The involvement of bone may represent direct tumor extension or metastasis from distant sites. Additionally, Immunostaining of the tumor cells showed strong diffuse positivity for Ber-EP4/MOC 31 (for the diagnosis of basaloid skin tumor), P40,

and cytokeratin 5/6 (CK5/6) (for the diagnosis of squamous carcinoma). The clinical and pathological diagnosis was invasive squamous cell carcinoma (Stage 4 a N0 M0). Based on a multidisciplinary medical management team recommendation, immunotherapy with a human monoclonal antibody (Cemiplimab at a dose of 350 mg q3 weeks) targeting programmed death receptor-1 (PD-1) was initiated. The patient continued the immunotherapy uneventfully and is scheduled for a follow-up surgical consultation after the immunotherapy treatment is completed.

Figure 1: Large, bulky, friable invasive cutaneous squamous cell carcinoma (cSCC) with suspicious bony extension.

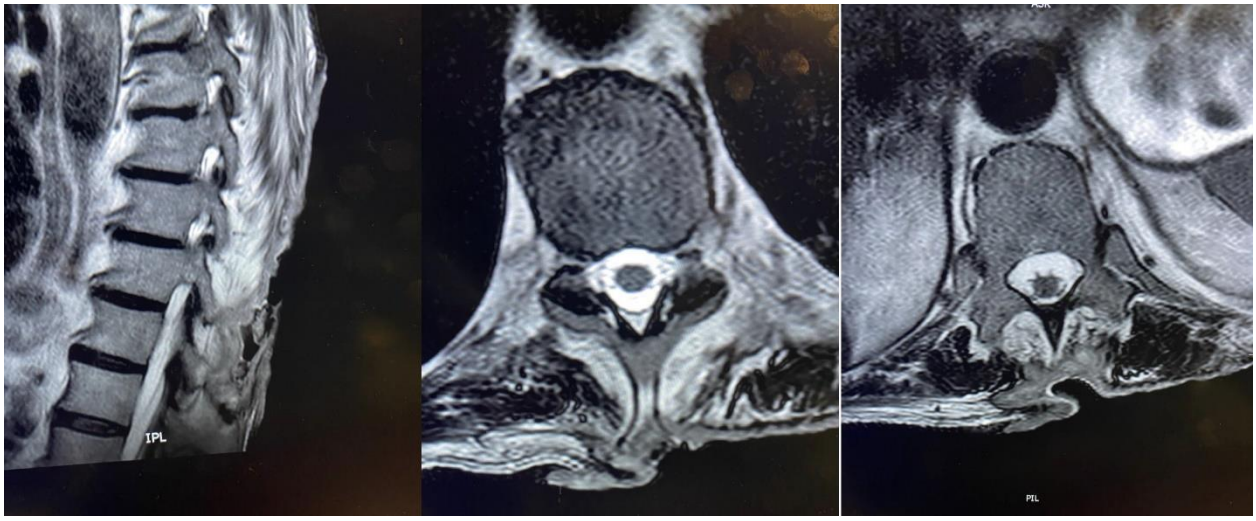

Figure 2: MRI image Sagittal and axial scans showing bony extension of the tumor of the Thoracic spine.

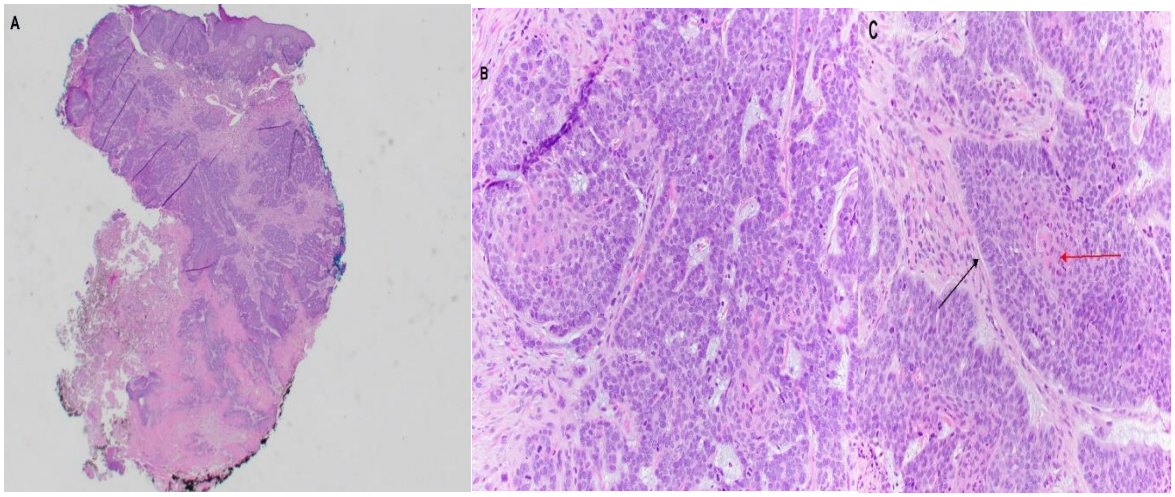

Figure 3: H&E slide at 2X magnification: A) Invasive carcinoma arising from the skin surface; B) invasive carcinoma with basaloid and squamous features; and C) Black arrow: artefactual stromal-epithelial clefting, red arrow: squamous differentiation.

DISCUSSION

Our case demonstrates the aggressiveness of cutaneous squamous cell carcinoma in a retired veteran who fought in the Korean War. Cutaneous squamous cell carcinoma (cSCC) is the second most common non-melanoma skin cancer (NMSC). Veterans are specifically at an increased incidence of NMSC compared to the general population.[1] This difference is likely due to exposure to the agent orange (herbicide), which was used in the Vietnamese and Korean Wars.

During the Korean and Vietnamese War, the United States military sprayed the herbicide Agent Orange. Agent Orange was sprayed over the rural landscapes to prevent opposition forces from hiding in the vegetation. The most toxic form is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), which has been classified by the World Health Organization (WHO) as a human carcinogen and was an inadvertent contaminant present in Agent Orange.[2] Imaging, along with immunohistochemical studies, confirmed the possible direct invasion of bone. Bone invasion has been a poor prognostic indicator in cutaneous SCC. In a recently published systematic review and pooled-survival analysis by Russell and colleagues[3] using individual patient data from 76 case reports (retrieved from 49 publications), it was illustrated that at 5 years from bone invasion diagnosis, patients had 66.7% progression-free survival (PFS), 71.7% disease-specific survival (DSS), and 66.2% overall survival (OS), respectively, with worse outcomes imparted to tumors of the trunk, head, and neck. However, the recent FDA approval (in 2021) of adjuvant immunotherapy (Cemiplimab, anti PD-1) for treating advanced SCC has shown promising results.[4]

Expert Opinion from Plastic Surgeon Perspectives:

There are intricate challenges confronted by reconstructive surgeons in addressing soft-tissue defects of the posterior trunk, which can originate from a myriad of etiologies including trauma, congenital malformations, complications from spine surgery, or in this case malignant tumors. A meticulous adherence to general surgical principles is imperative, necessitating thorough debridement and meticulous wound preparation. The complexity

of the situation is further compounded by the need to tailor the surgical approach according to the specific characteristics of the underlying tumor, which may dictate the suitability of single-stage or sequential operations. Additionally, the potential utility of vacuum-assisted wound conditioning cannot be overlooked as an adjunctive therapeutic modality in facilitating wound healing.[5]

Considering the inherent difficulties involved in reconstructing soft tissue in the posterior trunk due to its limited elasticity and the scarcity of microsurgical recipient vessels, it's crucial to carefully assess the available reconstructive options. While the definition of the posterior trunk may seem straightforward, it can be somewhat ambiguous. The vascular anatomy of the trunk has been described by Geddes et al. and is classified into four regions: the lumbar, upper back, belly, and chest. In particular, the upper back extends outward to the midaxillary line, downward to the lower border of the 12th rib, and upward from a line that connects the spinous process of C7 bilaterally to the acromial angle.[6] Furthermore, Geddes et al. demonstrated that, on average, the upper back is supplied by approximately 24 perforators, each corresponding to discrete perforasomes. These perforators originate superiorly from the thyrocervical trunk, laterally from the subscapular axis, and medially from the posterior intercostal arteries. In contrast, the lumbar region receives its blood supply from perforators originating from four paired sets of lumbar arteries.[6]

While therapeutic strategies such as secondary healing or skin grafts may offer some degree of benefit, their effectiveness may be limited in cases involving extensive defects or compromised tissue quality. Consequently, reliance on local tissue transfer becomes paramount, with an array of flap options available to address varying defect sizes and anatomical considerations. Long-term outcomes in the treatment of defects of the spine and bony thorax have been proved superior if flaps were used.[5] The selection of an appropriate flap necessitates a nuanced understanding of the surrounding tissue characteristics, as well as the surgeon's expertise and familiarity with the chosen technique. A guideline, structured based on arbitrary anatomical divisions of the back, should be an initial reference for choosing suitable primary and secondary flap alternatives.[7] An algorithmic approach is necessary to guide flap selection, although it must be adapted based on individual patient factors and surgical considerations. Notably, the upper, middle, and lower regions of the posterior trunk present distinct challenges, each requiring tailored reconstructive strategies.[7]

For defects in the upper region, where high traction forces are encountered, trapezius flaps represent a viable option, supplemented by latissimus dorsi flaps in cases where the trapezius muscle is compromised. In the middle thoracic region, both latissimus dorsi and trapezius flaps offer reliable coverage, with the former preferred due to its robust vascular supply and established efficacy. However, the choice between muscle-only and myocutaneous flaps depends on the specific requirements of the defect.[5,6] While in the lower thoracolumbar and lumbar regions, where therapeutic options are often more complex, the utility of latissimus dorsi flaps may be limited by their reach. Augmentation with vein grafts or alternative flap options, such as paraspinous muscle flaps or gluteus maximus flaps, may be warranted to achieve optimal outcomes. Notably, the advent of perforator flaps has expanded the armamentarium of reconstructive options, offering versatility and reliability in defect coverage.[5-7] Furthermore, literature delves into the nuances of transposition pattern and perforator flaps, highlighting their utility in harnessing the abundant perforating vessels inherent to the posterior trunk. By adhering to established principles of flap design and angiosome mapping, these flaps offer a safe and effective means of addressing soft-tissue defects, albeit contingent on the quality of surrounding tissue and the surgeon's proficiency in flap dissection.[5-7] Pedicled fasciocutaneous flaps, including parascapular, scapular, and gluteal perforator flaps, are

explored as viable options for defect coverage, with considerations for flap dimensions and vascular pedicle dissection. Additionally, supraclavicular flaps emerge as a promising option for addressing defects in the dorsal neck region, owing to their reliable vascular supply and versatility in flap design.[5] Lastly, the paraspinous muscle flap presents an alternative solution for addressing small defects in the paravertebral region. These muscles, situated from the lumbar region up to the 10th thoracic vertebrae, are commonly employed as bi-pedicled turn-over flaps. The flap dissection involves detaching the muscles from the transverse processes of the vertebrae and advancing them medially, facilitating closure of wounds in the peri-vertebral area using two pedicled paraspinous flaps.[5-7]

REFERENCES

1. Mark W Clemens, Andrew L Kochuba, Mary Ella Carter, Kevin Han, Jun Liu, Karen Evans. Association between Agent Orange exposure and non melanotic invasive skin cancer: a pilot study. Plast Reconstr Surg. 2014;133(2):432-437.
2. Veterans' diseases associated with Agent Orange. US Dept of Veterans Affairs website. http://www.publichealth.va.gov/PUBLICHEALTH/exposures/agentorange/conditions/index.asp. Accessed 3/10/2023.
3. Russell E, Udkoff J, Knackstedt T . Squamous Cell Carcinoma with Bone Invasion: A Systematic Review and Pooled Survival Analysis. Dermatol Surg. 2022;48(10):1025-1028.
4. Migden MR, Rischin D, Schmults CD. PD-1 blockade with cemiplimab in advanced cutaneous squamous-cell carcinoma. N Engl J Med. 2018;379(4):341-351.
5. Behr B, Wagner JM, Wallner C, Harati K, Lehnhardt M, Daigeler A. Reconstructive Options for Oncologic Posterior Trunk Defects: A Review. Front Oncol. 2016;6:51.
6. Geddes C R, Tang M, Yang D, Morris S F. Anatomy of the integument of the trunk. In: Blondeel P N, Morris S F, Hallock G G, Neligan P C, editors. Perforator Flaps: Anatomy, Technique, & Clinical Applications. St. Louis, MO: Quality Medical Publishing; 2006. pp. 360–384.
7. Hallock GG. Reconstruction of posterior trunk defects. Semin Plast Surg. 2011;25(1):78-85.