Taking a Stab at Dedifferentiated Metastatic Liposarcoma - A Case Report of Successful Treatment with Pulsed Electric Fields

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Introduction

The purpose of this case study is to exhibit the successful treatment of metastatic dedifferentiated liposarcoma (DDLPS) in an elderly male patient via Pulsed Electric Fields (PEF) monotherapy. Treatment was provided via the Aliya™ PEF System (*Figure 1*) produced by Galvanize Therapeutics Inc (CA, USA). PEF therapy uses electrical pulses to increase cellular transmembrane potential, resulting in osmotic swelling and apoptosis. This non-thermal method of cellular disruption results in release of cellular and stromal proteins, presenting the immune system with neoantigens.

Methods and Materials

The patient was a 71-year-old male with DDLPS of the left thigh with extensive metastatic disease, including over 20 pulmonary nodules and a large right ventricular mass (*Figures 2A, 3A*), who presented with shortness of breath secondary to segmental pulmonary embolism. He was found to be a poor candidate for chemotherapeutic, immunologic, or surgical therapy. PEF was chosen due to the patient's refusal of any other treatment and in anticipation of abscopal effects [1]. The procedure was conducted under local anesthesia and light sedation over 15 minutes. He received treatment with the Aliya™ system's 19G, 20 cm percutaneous needle which delivered three doses of 3kV, monopolar, biphasic PEF energy to the left thigh tumor. Therapy was synchronized to the R-wave of the patient's cardiac cycle to minimize the risk of cardiac complications.

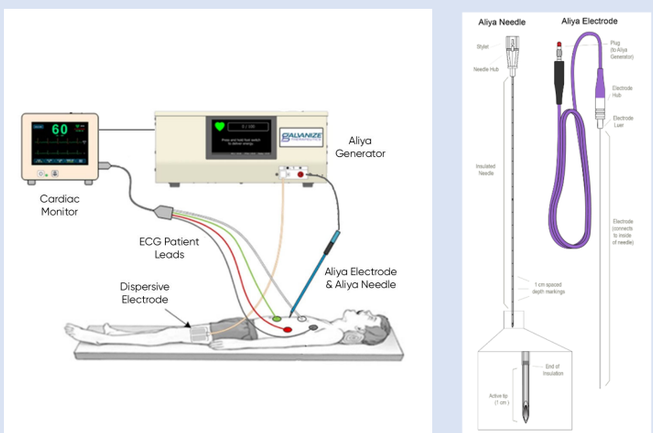

Figure 1: Illustrative diagram of the Aliya™ PEF System, including the cardiac monitoring system (*left*) and needle schematics (*right*).

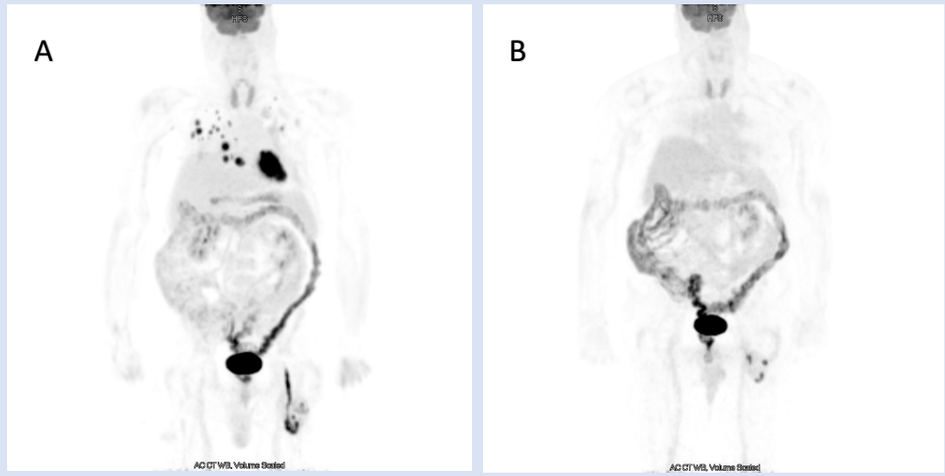

Figure 2: A) On the left, maximum intensity projection (MIP) of the coronal Initial PET/CT demonstrates abnormal uptake, most prominent in the primary left thigh site and the chest; B) on the right, MIP of the coronal PET/CT at the 3-month follow-up demonstrates remarkable improvements at both the primary site and metastatic sites.

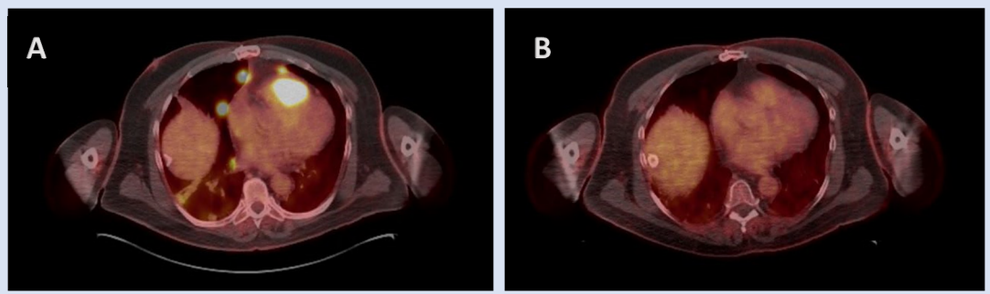

Figure 3:A) On the left, an axial view from the initial PET/CT demonstrates abnormal uptake at an anterior right ventricular myocardial mass and at multiple bilateral pulmonary nodules; B) on the right, an axial view of a PET/CT at the 3-month follow-up demonstrates no significant abnormal uptake in the patient's chest.

Results

The procedure was well-tolerated by the patient. At three months post-treatment, CT/PET revealed a complete metabolic response in the patient's chest in the absence of any concomitant systemic therapy (*Figures 2B, 3B*). Six-month follow-up displayed a durable response in the chests and decreased size and avidity of the left thigh tumor. The patient reported no symptoms, regained weight, and resumed regular physical activity.

Conclusion

The Aliya™ PEF system proved to be a safe and efficacious therapeutic option for local disease control in a patient with DDLPS who had limited alternative therapeutic options. It also demonstrated an incredibly effective systemic response that treated widespread metastases at the three and six-month follow-ups, likely due to immunologic response to PEF and the resulting formation of tertiary lymphoid structures [2]. This case suggests that PEF therapy may be an invaluable treatment option for patients with metastatic disease, particularly when traditional therapeutic alternatives are limited. Further investigation into its application for various cancer types is warranted, both as monotherapy and in combination with immunotherapy.

References

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2. Iding J, VanderLaan P, Jimenez M, et al, Tertiary lymphoid structures (TLS) observed in non-small cell lung cancer (NSCLC) tumors treated with pulsed electric fields. Journal for ImmunoTherapy of Cancer 2022;10:doi: 10.1136/jitc-2022-SITC2022.0702

Disclosures

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