

## Case Report

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# Photodynamic Therapy for the Treatment of Skin Cancer in Patients with Idiopathic Thrombocytopenia: A Case Report

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### ABSTRACT

Idiopathic Thrombocytopenia (IT) is an autoimmune disease in which the patients present a reduction of blood platelets, increasing the risk of bleeding and its complications. Especially, elderly patients those with neoplasia associated to idiopathic thrombocytopenia are more likely to severe risks of bleeding. Here were report a case of an eighty-year-old man with diagnosis of idiopathic thrombocytopenia and confirmed biopsy of nodular basal cell carcinoma (nBCC) located on the nose. The use of the standard treatment surgery was not carried in this case due to risks generated by autoimmune disease. Photodynamic Therapy (PDT) was indicated as an adjuvant therapy associated to shaving and electrocoagulation providing elimination of recent cancer cells. This PDT is an alternative for the treatment of modular basal cell carcinoma no greater than 2 cm of diameter and small depth. The patient was treated with shaving, electrocoagulation and topical PDT using 20% methyl aminolevulinate (MAL) and fluency of 150 J/cm<sup>2</sup> with 630 nm light. This adjuvant treatment of nodular BCC is minimally invasive and can be indicated to patients with surgical risks, and that is the importance for this report. The success of this case is an important precedent for thousands of patients' with similar conditions.

**KEYWORDS:** Idiopathic thrombocytopenia (IT); Nodular basal cell carcinoma (nBCC); Photodynamic therapy (PDT); Adjuvant therapy; Surgical risks.

### BACKGROUND

Non-Melanoma Skin Cancers (NMSC) are the most prevalent cancer worldwide and the Basal Cell Carcinoma (BCC) is the most common and with high frequency.<sup>1,2</sup> The NMSC are located in the many anatomic sites with high frequency in head and neck (80% of cases). It is estimated that 50% of all BCCs can recur within 10 years.<sup>3</sup> The surgery is the gold standard for the treatment of BCC.<sup>4</sup> The type of surgery and the functional capacity of patients identify the risk of this treatment.<sup>5,6</sup>

Idiopathic Thrombocytopenia (IT) is an autoimmune disease and characterized by low platelets levels in blood. Hemostatic changes during and after surgical procedure may cause serious risk to the patient. Thrombocytopenia is one of the main hemostatic disturbances observed in postoperatively procedure in the case of IT. The electrocoagulation to a patient with IT is an option to stop the bleeding in case if there is necessity of tissue removal. The mortality related to IT in adult patients can be up to 7.5% and the morbidity is directly related to serious bleeding complications. Bleeding may occur in aged patients and in those cases with neoplasias complications much more frequently.<sup>7</sup>

Topical treatments of NMSC including photodynamic therapy (PDT) have been approved due to clinical efficacy<sup>8</sup> and minimized risks and cost. In this technique, a light source with an appropriate wavelength activates a photo sensitizer (such as protoporphyrin IX, chlorins and curcumin) and produces reactive oxygen species (ROS), which are cytotoxic to tumor

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cells and microorganisms. In general, the geometrical factors as size and depth are important factors in PDT outcome results. Normally, shallow and small lesions are ideal for topical PDT. The PDT presents no risks to the patients and may be indicated alone or in association with other techniques.<sup>9</sup>

A common procedure in PDT is the shaving, which removes superficial cancer cells as well as death skin promoting the augment of the photo sensitizer absorption in deeper layers of the skin. The association of a deep penetration and adequate distribution of the light kills deeper tumor cells and increases the chances of cure, reducing tumor recurrence. Although shaving is a common procedure, it may cause bleeding in patients with IT. As a procedure, shave followed by electrocoagulation is an acceptable combination specially in the case of bleeding risk. In this case, we demonstrated the effectiveness of PDT as a co-adjuvant treatment of nodular BCC in patients with idiopathic thrombocytopenia.

#### CASE STUDY

An eighty-year-old man with four years of nodular BCC diagnosis (18 mm width and 22 mm length) in the ala of nose, refused to undergo the surgery due to his IT condition.

The shaving was realized in the lesion followed by the electrocoagulation. After two weeks, the lesion was curetted previously by PDT. The 20% methyl aminolevulinate (MAL) cream (PDT Pharma, São Paulo, Brazil) was applied and after three hours of occlusion the illumination was performed for 20 minutes using the device LINCE® (MM Optics, São Carlos-SP, Brazil) operating at 630 nm with a superficial intensity of 125 mW/cm<sup>2</sup>. After seven days, the second PDT session was performed using the same protocol, and with only a gentle curettage, without bleeding, just before the MAL cream application.

In Figure 1 is shown the lesion before the treatment (Figure 1A); the lesion two weeks after shaving followed by

electrocoagulation (Figure 1B); the lesion seven days after the first PDT session (Figure 1C); the lesion 30 days after the second PDT session (Figure 1D).

The clinical and histopathological evaluation was carried out thirty days after the second PDT procedure. The aesthetical and clinical results were satisfactory. A papule measuring 3×2 mm was observed 30 days after second PDT session (Figure 1D) and histopathology indicated fibrosis with the BCC cure.

#### DISCUSSION AND CONCLUSION

Surgical procedures are not recommended for patients with IT. Minor surgeries may be undertaken in people with IT as tooth extractions and biopsy diagnosis of smaller tumors with great care and concern. There are bleeding risks in those patients during or following the surgery.<sup>10</sup>

Baas et al have shown that PDT may be combined with other techniques such as surgery with great success. Nevertheless, the PDT alone with adequate lesion penetration can also promote excellent outcome. In case of nodular lesion shaving is necessary. The shaving is a technique widely used before PDT removing the cancer cell above the skin surface as well as removing cells layer for cream penetration. The electrocoagulation was performed to assist in blood coagulation promoting the wound healing. The PDT in the shaved lesion, also promotes a favorable environment for wound healing due its efficiency in microbial inactivation.<sup>13,14</sup> The low levels of ROS generated after PDT stimulates the cellular activities involved in healing process as well.<sup>15</sup>

We have observed that the light in wavelength of 630 nm penetrates quite well in a large volume of tissue assuring a wide area of action after the tumor was shaved. The MAL is a compound predominantly used for NMSC treatment, actinic keratosis and cancerization field.<sup>11,12</sup> The margins involved with cell cancer may vary from 4% to 18% of lesion size and the



**Figure 1:** Clinical results of a case report using PDT as adjuvant therapy: Before the treatments (A); two weeks after shaving and electro coagulation (B); a week after the PDT first session (C); 30 days after second PDT session (D).

procedure employed cover this margin. The use of associated techniques may enhance the action field of nodular BCC. Therefore, preventing future recurrences of the lesion that would lead to new treatments and risk to patient.

The anatomical localization of lesion is a relevant factor in PDT indication. The nasal ala presents well-known difficulties in surgical reconstructions. The use of PDT promoted the reconstruction of tissue by healing process after cancer cells elimination, retesting inadequate aesthetic results (Figure 1D).

The number of localized skin cancer cases for patients with natural difficulties for surgical procedure is quite large. In this case, moderate shaving procedure followed by PDT is quite well recommended. In the case of bleeding risks the combined used of shaving with electrocoagulation followed by PDT is a way to assured treatment much beyond removed by the shaving alone.

In summary, PDT is a noninvasive technique with small risks to patients with IT that may be used in association to others therapies expanding its indications. In addition, photodynamic inactivation provides good cosmetic outcomes in difficult anatomical region of surgical reconstruction and improves patient's quality of life. PDT is always provides evidences for an excellent technique as coadjutant in cases where surgery is quite risks.

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## CONSENT

The patient has provided written permission for publication of the case details.

## CONFLICTS OF INTEREST:

None.

## REFERENCES

1. Madan V, Lear JT, Szeimies R-M. Non-melanoma skin cancer. *Lancet*. 2010; 375(9715): 673-685. doi: [10.1016/S0140-6736\(09\)61196-X](https://doi.org/10.1016/S0140-6736(09)61196-X)
2. De Zwaan SE, Haass NK. Genetics of basal cell carcinoma. *Australas J Dermatol*. 2010; 51(2): 81-92; 93-94. doi: [10.1111/j.1440-0960.2009.00579.x](https://doi.org/10.1111/j.1440-0960.2009.00579.x)
3. Ermertcan AT, Hellings PW, Cingi C. Nonmelanoma skin cancer of the head and neck: nonsurgical treatment. *Facial Plast Surg Clin North Am*. 2012; 20(4): 445-454. doi: [10.1016/j.fps.2012.08.004](https://doi.org/10.1016/j.fps.2012.08.004)
4. Telfer NR, Colver GB, Morton CA. Guidelines for the management of basal cell carcinoma. *Br J Dermatol*. 2008; 159(1): 35-48. doi: [10.1111/j.1365-2133.2008.08666.x](https://doi.org/10.1111/j.1365-2133.2008.08666.x)
5. Studer P, Inderbitzin D. Surgery-related risk factors. *Curr Opin Crit Care*. 2009; 15(4): 328-332. doi: [10.1097/MCC.0b013e32832be4de](https://doi.org/10.1097/MCC.0b013e32832be4de)
6. Slichter SJ. Relationship between platelet count and bleeding risk in thrombocytopenic patients. *Transfus Med Rev*. 2004; 18(3): 153-167. doi: [10.1016/j.tmr.2004.03.003](https://doi.org/10.1016/j.tmr.2004.03.003)
7. Cooper C, Fairris G, Cotton DW, Steart P, Barth JH. Dermatomyositis associated with idiopathic thrombocytopenia. *Dermatologica*. 1986; 172(3): 173-176. doi: [10.1159/000249325](https://doi.org/10.1159/000249325)
8. Ramirez DP, Kurachi C, Inada NM, et al. Experience and BCC subtypes as determinants of MAL-PDT response: Preliminary results of a national Brazilian project. *Photodiagnosis Photodyn Ther*. 2014; 11(1): 22-26. doi: [10.1016/j.pdpdt.2013.11.001](https://doi.org/10.1016/j.pdpdt.2013.11.001)
9. Dubas LE, Ingraffea A. Nonmelanoma skin cancer. *Facial Plast Surg Clin North Am*. 2013; 21(1): 43-53. doi: [10.1016/j.fsc.2012.10.003](https://doi.org/10.1016/j.fsc.2012.10.003)
10. Papamatheakis DG, Demers P, Vachon A, Jaimes LB, Lapointe Y, Harasymowycz PJ. Thrombocytopenia and the risks of intraocular surgery. *Ophthalmic Surg Lasers Imaging*. 2005; 36(2): 103-107. doi: [10.3928/1542-8877-20050301-04](https://doi.org/10.3928/1542-8877-20050301-04)
11. Cosgarea R, Susan M, Crisan M, Senila S. Photodynamic therapy using topical 5-aminolaevulinic acid vs. surgery for basal cell carcinoma. *J Eur Acad Dermatol Venereol*. 2013; 27(8): 980-984. doi: [10.1111/j.1468-3083.2012.04619.x](https://doi.org/10.1111/j.1468-3083.2012.04619.x)
12. Peng Q, Soler AM, Warloe T, Nesland JM, Giercksky KE. Selective distribution of porphyrins in skin thick cell carcinoma after topical application of methyl 5-aminolevulinate. *J Photochem Photobiol Biol*. 2001; 62(3): 140-145. doi: [10.1016/S1011-1344\(01\)00173-7](https://doi.org/10.1016/S1011-1344(01)00173-7)
13. Jori G, Fabris C, Soncin M, et al. Photodynamic therapy in the treatment of microbial infections: basic principles and perspective applications. *Lasers Surg Med*. 2006; 38(5): 468-481. doi: [10.1002/lsm.20361](https://doi.org/10.1002/lsm.20361)
14. Braham P, Herron C, Street C, Darveau R. Antimicrobial photodynamic therapy may promote periodontal healing through multiple mechanisms. *J Periodontol*. 2009; 80(11): 1790-1798. doi: [10.1902/jop.2009.090214](https://doi.org/10.1902/jop.2009.090214)
15. Lubart R, Eichler M, Lavi R, Friedman H, Shainberg A. Low-energy laser irradiation promotes cellular redox activity. *Photomed Laser Surg*. 2005; 23(1): 3-9. doi: [10.1089/pho.2005.23.3](https://doi.org/10.1089/pho.2005.23.3)