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Mir Saleem

Nova Southeastern University, saleem@nova.edu

Julianna Robinson

Nova Southeastern University, jr2560@mysu.nova.edu

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Treatment Outcomes of Mohs Surgery vs. Imiquimod in Basal Cell Carcinoma.

Mir Saleem¹, Julianna Robinson²

¹NOVA Southeastern University, Halmos College of Natural Sciences and Oceanography.

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ABSTRACT

Background: Basal Cell Carcinoma (BCC) is a type of skin cancer, and a growing number of cases are diagnosed each year. There are many treatment options available, however finding the best treatment that has the lowest recurrence rate and morbidity is a challenge. The treatment options vary from topical or systemic medications to special procedures to surgical interventions. Treatment's effectiveness largely differs on the BCC sub-type and its individual features. **Method:** Data was collected from the charts of patients that were diagnosed with BCC. The selected patients were treated by either Mohs surgery or Imiquimod. **Results:** Majority of patients who were diagnosed with BCC had light skin color. Some patients had recurrence of the disease after Imiquimod treatment. However, no patient had any recurrence with Mohs surgery. **Conclusion:** This study shows that Mohs surgery provides superior treatment outcome than many other options. However, cost of the procedure can be an issue to patients with lower income or lack of proper health insurance.

Keywords: Basal cell carcinoma, Mohs surgery, Imiquimod, treatment options for BCC.

INTRODUCTION

Basal Cell Carcinoma (BCC) is a common forms of human skin cancer, and have become a great public health concern. Due to a rising rate of diagnosis and high rate of morbidity from the disease, finding the best treatment becomes an important priority.^[1] Each year, more than 5 million cases are diagnosed with nonmelanoma skin cancer (NMSC). Among those patients, 80% are basal cell carcinomas. Although, mortality rate for these types of cancers are very low; however, the number of cases are increasing, which may be due to early diagnosis, higher sun exposure and elderly patients are living longer.^[2] Basal cell carcinoma has high morbidity and increased cost to health services, in spite of the low death rate.^[3] Nonmelanoma skin cancer is mainly divided into basal cell carcinoma and squamous cell carcinoma with an estimated cost \$4.8 billion per year.^[4] The treatment options are determined largely by how easily the tumors may be excised as well as the lesion's depth of penetration into the skin. The following treatment options are available for treatment of basal cell carcinoma.

Cryotherapy is a treatment that involves a fine mist

of liquid nitrogen that freezes living tissue. This effectively kills abnormal cells, in addition to normal cells. The death of all the tissue in a small area will make it possible for healthy cells to replenish the dead tissue. Depending on how deep the lesion protrudes, longer or shorter freeze thaw cycles may be used to increase the chance of complete removal. This is usually a quick, but rather painful treatment that has been used as an initial treatment for many cases. Cryosurgery is an effective treatment modality for eyelid basal cell carcinomas, resulting in few recurrences and good cosmetic and functional outcomes at a low cost.^[5] Compared with surgical techniques, cryotherapy has a cure rate of 85 – 90%. This is the main reason that it is less commonly used.^[6]

Imiquimod (IMQ) 5% cream is an immunomodulatory and antitumorogenic agent, which is used as a topical treatment regimen, who had periocular basal cell carcinoma (BCC).^[7] This is typically not painful, but requires a longer period of time for treatment to be successful. Duration of treatment is usually about 6 weeks, and can be very costly if the lesion is very large.^[8]

Standard surgical excision is primarily done for most cases.^[9] The tumor is generally removed with a 4mm vertical margin and the sample is sent to a pathologist for examination via bread-loaf microscopy. There is between a 1.5% and 28.5% risk of incomplete removal which would be recognized in the pathology report of the specimen after surgery.^[10] Errors may also take place on the sectioning technique used by the pathologist. Bread-

Name & Address of Corresponding Author

Mir Saleem, MD, MS
3rd Floor, Parker Building, Dept. of Biology
3301 College Avenue
Halmos College of Natural Sciences and Oceanography
NOVA Southeastern University
Fort Lauderdale, FL 33314
USA.

loaf microscopy (vertical sections) does not examine the margins to the extent it may need, and thus may result in a possible overlook of a tumor nest existing beyond the border of excision. This overlook would then result in another round of excisions.^[11] This would result in additional surgery with extra cost, or the cancer could persist and silently lurk throughout the patient's body.^[12]

Mohs surgery is a more careful and precise procedure, which allows for less significant defects after treatment.^[13] It is cost-effective, especially when dealing with poorly demarcated, high-risk, facial tumors, where it should be considered as the first choice of treatment.^[14] Five-year recurrence rates using Kaplan-Meier survival analysis is very low for previously untreated BCC.^[15]

Radiotherapy can be used for facial lesions; however, treatment failure is higher in aggressive tumors and healing is delayed for weeks or even months.^[16]

Photodynamic therapy is useful for superficial lesions only because it cannot properly penetrate to deeper parts of skin.^[16] The cure rate for PDT is between 70 – 90%.^[6]

MATERIALS AND METHODS

A total of 60 patients' charts from a local dermatology clinic were reviewed for this study. These patients received either Imiquimod or Mohs surgery. Patients' data including skin color, gender, and age as well as cost, and treatment outcomes were recorded. In Mohs surgery, once the skin was removed, the entire sample was instantly prepped for histological evaluation. The pathologist then examined the sample to decide if the borders were clear of malignancy. If not, the surgical mark was expanded in the direction of its microscopic, observable location. Patients were followed up in one year after Mohs surgery.

In patients who received Imiquimod cream, successful treatment was determined by a physician, after a complete initial cycle of application 4-8 weeks, depending on the size and sub-type of BCC. Imiquimod complete success was considered 1 year after last application.

RESULTS

Out of 60 patients diagnosed with BCC, 45 patients received Mohs surgery and 15 patients received Imiquimod. Thirty-eight patients were men and 22 were women. Based on skin color type using the Fitzpatrick's scale, 17% were very pale white, 28% were white/fair, 37% were white/olive, 13% were medium/dark brown, and only 5% were very dark brown/black. Of those that were diagnosed with BCC, 7 patients were between the ages of 21 and 45 years, 17 patients were between 46 and 65 years and

the remaining 36 patients were over 65 years old. None of the patients were under the age of 20 years.

The recurrence rate varied based on treatment modality. There was no recurrence in patients who received Mohs Surgery. Three patients who received Imiquimod treatment had recurrent disease (20%). Analysis of cost of both treatments showed that Mohs surgery had the higher cost (\$1,050) compared with Imiquimod (\$800). These fees were out of pocket cost for patients and did not account for insurance coverage.

DISCUSSION

Although, the most likely type of skin tone that was diagnosed with BCC was white/olive presumably due to decreased level of protection from melanin pigment; however, the cancer also developed even in patients with very dark/black skin. Additionally, age was also a factor that seemed to play a part in BCC diagnosis. According to data, prevalence was higher in older population. This could be due to a development of accumulated mutations over the course of a longer time of life. Moreover, the skin may not visibly show signs of damage until many years later after exposure, especially if it is long-term or consistent exposure. Furthermore, men were almost twice as likely to be diagnosed with BCC than females; however, it should also be noted that this may not be necessarily due to genetic predisposition of the sexes. There are a variety of factors to consider, such as, the possibility that men may be less likely to notice an odd lump/lesion than women possibly due to facial hair, or higher exposure to UV radiation due to participation in more outdoor activities.

The success of treatments was based of BCC recurrence rates for each type of treatment. Only three of the fifteen patients who were treated with Imiquimod returned for recurrence; however, Imiquimod is usually given to patients with smaller, less severe lesions. The sample size was also small in this case. Surgical excisions were more often prescribed for the best outcomes as Imiquimod is a relatively new treatment option. Thus, patients receiving Imiquimod treatment, most likely had a lesion that was not likely to pose as much of a risk or the location made excisional surgery difficult to carry out.

The most promising type of treatment was Mohs Surgery because none of the treated patients had recurrence of BCC. In standard surgical excision, initial treatment is considered successful if the BCC is determined to be completely removed via microscopy. However, in the Mohs surgery, specific training and personal judgment of the physician is needed to remove the entire malignancy but at the same time minimizing the amount of skin loss. It is the best type of treatment for BCC, if it is done by a careful, skilled professional on a proper candidate.

When considering a proper candidate for treatment options, it is determined at the discretion of the physician. The physician would consider the size, shape and color of the lesion as well as how deep it may protrude. In addition, other factors to consider for choosing the correct treatment option include how long the lesion has been there as well as patient's age, medical history, and lifestyle. The average billing for Mohs Surgery is higher than Imiquimod. However, the cost of treatment varies widely for different regions and countries.

CONCLUSION

With so many cases of NMSC diagnosed each year, research for diagnosis and treatments are essentially vital. Although NMSC generally sees very high cure rates and good cosmetic outcomes, it remains a public health crisis due to the large number of people effected. The treatment plans for a wide variety of skin irregularities are usually similar, differing mainly on how deep its protrusion is. Another important factor for determining a treatment plan includes the risk of incomplete removal. If a pathology report even slightly hints that a lesion may radiate outward in small abundance, its removal must be done extremely carefully. Finally, the physician must consider the outcome based on appearance and/or lifestyle of the patient to minimize the amounts and severity of defects after treatment. Mohs surgery is the most successful treatment option for BCC, even though it is more expensive than alternative treatments. Future direction is required to collect and analyze larger sample data for recurrence rates of BCC since it is largely categorized together, along with SCC within the broader category of NMSC.

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