



Basal Cell Carcinoma (BCC) with Risk Factors of Exposure to Burns: A Case Report Study

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ABSTRACT

Basal cell carcinoma (BCC) is the most common skin cancer, with a higher incidence than all other malignancies combined. Although metastases are rare, patients with multiple or frequently recurrent BCC can suffer from major and difficult-to-manage comorbidities. The choice of therapy in cases of skin cancer must be adjusted based on the type of histological lesion, size, location and age of the patient. No single therapy is ideal for all lesions. We report a case of BCC in a woman in a limited health facility without a dermatologist venereology oncology specialist. A 41-year-old woman came with complaints of a lump on her right cheek that had been slowly enlarging for the last 4 years and a week ago complained of itching at the edge of the lump. Local examination revealed a skin-colored nodule with surrounding telangiectasis. Even though the lump previously did not show any symptoms, the patient wanted the lump removed. The doctor decided to perform excision surgery. Histopathology results showed nodular BCC and the tumor had grown to the edge of the tissue, therefore the doctor decided to refer to an oncologist for additional surgery or radiotherapy. In conclusion, multiple BCC in women in limited health facilities is a complex challenge. Collaboration between general practitioners, specialist doctors, and other stakeholders is needed to increase access to quality health services and improve treatment outcomes for patients with BCC in remote areas.

1. Introduction

Basal cell carcinoma (BCC) is the most common skin cancer, with an incidence that far exceeds all other types of skin malignancies combined. In the United States, an estimated 3 million new cases of BCC are diagnosed each year, and this number continues to increase. Although it rarely metastasizes, BCC can cause significant local damage and bothersome cosmetic complications. Patients with multiple or frequently recurrent BCC can experience complex and difficult-to-manage comorbidities, requiring a comprehensive and individualized

treatment approach. BCC affects individuals of all races and ethnicities but is most commonly found in white people. The main risk factor for developing BCC is chronic exposure to ultraviolet (UV) light, both from sunlight and artificial sources such as tanning beds. The risk of BCC is also increased in individuals with a family history of BCC, a history of radiation therapy to the skin, a weakened immune system, and a history of burn trauma.¹⁻³

In Indonesia, national statistical data on the incidence of BCC is not yet available in a comprehensive manner. However, several studies



show that BCC is one of the most common types of skin cancer in Indonesia. Access to adequate health services, especially for patients in remote areas, is still limited. This can lead to delays in diagnosis and treatment of BCC, which can increase the risk of complications and death. The lack of dermatology venereology oncology specialists in health facilities can lead to misdiagnosis or delays in referral to an oncologist. Health facilities in remote areas may not have adequate equipment to diagnose and treat BCC. Lack of public education about skin cancer, including early detection and treatment, can cause delays in BCC detection and diagnosis. Delays in diagnosis and treatment of BCC can increase the risk of complications and death. Patients with multiple or frequently recurrent BCC may experience complex and difficult-to-manage comorbidities, which can reduce their quality of life. The high-cost burden of treating BCC can burden patients and the health system. Studies of BCC in health facilities can help identify factors that contribute to delays in diagnosis and treatment. The study results can be used to develop effective strategies to increase access to adequate health services for BCC patients in health facilities. Studies on BCC in Health Facilities can help improve public education about skin cancer, including early detection and treatment.⁴⁻⁶

2. Case Presentation

A 41-year-old woman presents to the dermatology and venereology department of Dr. Ramelan Naval Central Hospital Surabaya with a chief concern of a lump on her right cheek. She states that a lump has grown slowly over the past 4 years. At first, she thought a lump was a pimple, but it seemed the lump didn't heal. It was no pain or itching. She also states a lump was rarely touched or manipulated. However, it started to bother her because a week ago the edge of a lump felt itchy. she is worried that something bad will

happen. Her mother's history was breast carcinoma. She works selling home-cooked food in the canteen. There was no history of prolonged sun exposure. Local examination revealed a skin-colored nodule measuring 8 mm in the right cheek with visible blood vessels surrounding it (telangiectasis). the center of the nodule looks concave. These findings are described in Figure 1 A. On examination of lymph nodes, there is no enlargement. Other systems examinations were normal. Based on anamnesis and clinical examination, the working diagnosis for the case was benign neoplasm of skin with differential diagnosis of basal cell carcinoma and squamous cell carcinoma. We planned for surgical excision (Figure 1B and Figure 1C) and carried out a histopathological examination.

Surgical excision involves cutting away the cancerous lesion and the surrounding area of healthy skin. For the patient was obtained a piece of tissue measuring 1.3x1x0.65 cm with a grayish-white and brownish color, dense and chewy. Histopathological examination revealed pieces of tissue layered in the epidermis of the skin. The underlying fibro collagenous connective tissue stroma with nodular tumor growth (Figure 2A), contains a proliferation of basaloid cells (Figure 2B, 2C) with round-oval nuclei, mild pleiomorphic, coarse chromatin. Arranged in nests separated by clefts with a surrounding fibro-collagen connective tissue stroma (Figure 2D). Tumors at the edges continue to be palisading, tumors grow to the edges of the tissue. The conclusion from the histopathological examination results was secretion with nodular basal cell carcinoma and the tumor grew to the edge of the tissue.

Based on anamnesis, clinical examination, and histopathological examination, the working diagnosis for the case was nodular basal cell carcinoma. Basal cell carcinoma was also found at the edge of the tissue and was therefore referred to the Oncologist for additional surgery or radiotherapy.



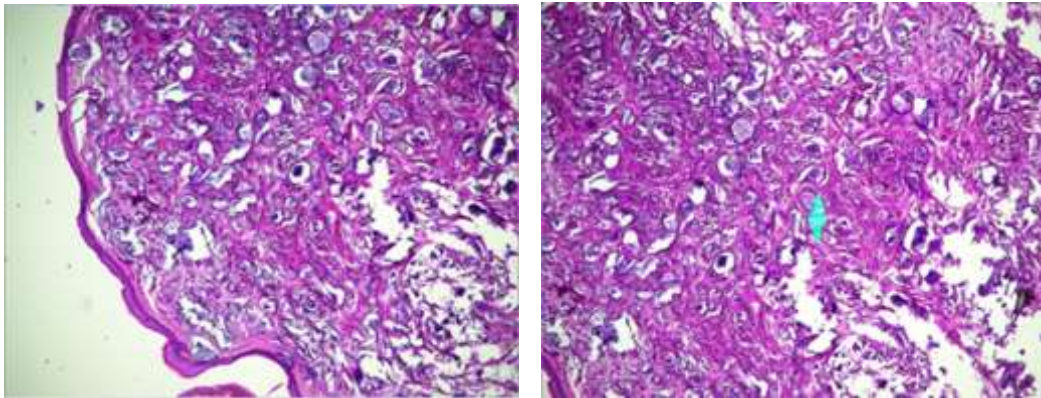


A

B

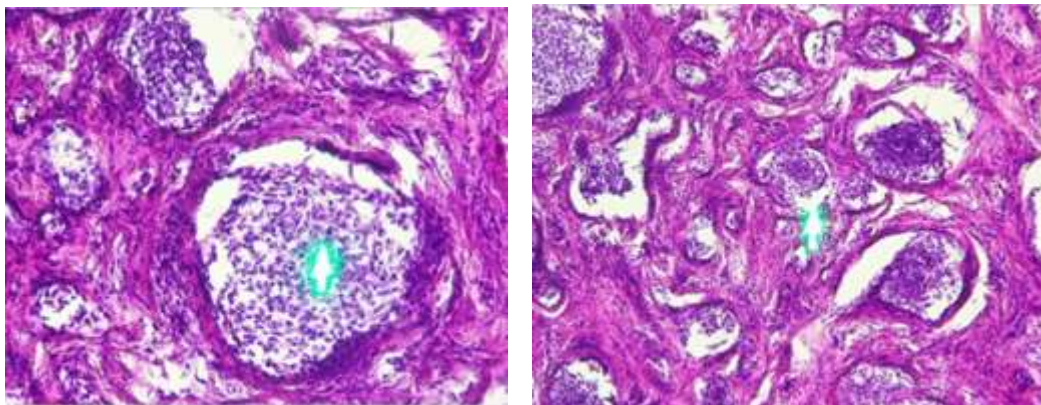
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Figure 1. Nodule picture. A. nodule with telangiectasis. B. Suturing after surgical excision. C. Skin condition after suture removal.



A

B



C

D

Figure 2. Histopathological picture. A. Pieces of nodular tumor tissue layered with epidermis. B. contains a proliferation of basaloid cells arranged in groups (arrow). C. basaloid cells (arrow). D. groups of basaloid cells are separated by clefts (arrows) from the surrounding tissue.



3. Discussion

Basal cell carcinoma (BCC) is the most common skin cancer, with an incidence that far exceeds all other types of skin malignancies combined. BCC rarely metastasizes but can cause significant local damage and bothersome cosmetic complications. The main risk factor for developing BCC is chronic exposure to ultraviolet (UV) light, both from sunlight and artificial sources such as tanning beds. A history of burns has also been associated with an increased risk of BCC. Epidemiological studies have demonstrated an association between burns and BCC, with some studies showing up to a 10-fold increased risk in individuals with a history of severe burns. Burns, especially severe burns, can cause high levels of oxidative stress, producing free radicals that can damage the DNA of skin cells. This DNA damage can cause mutations in genes involved in controlling cell growth, such as the p53 gene and the Ras gene. Mutations in the p53 gene can disrupt a cell's ability to repair DNA damage and trigger abnormal cell proliferation, increasing the risk of cancer. Mutations in the Ras gene can activate uncontrolled cell growth signals, driving tumor development. Severe burns often trigger a chronic inflammatory response at the wound site. Chronic inflammation can result in the release of cytokines and growth factors that can promote cell proliferation and angiogenesis, creating an environment conducive to cancer development. Inflammatory cells that accumulate at the wound site can produce free radicals and proteolytic enzymes that can further damage DNA and surrounding tissue, increasing the risk of mutations and cancer development. Burns, especially severe burns, can cause systemic immunosuppression, weakening the immune system's ability to recognize and destroy cancer cells. This reduction in immunosuppression can provide an opportunity for cancer cells to develop and escape detection and elimination by the immune system. A cohort study in Sweden found that individuals with a history of severe burns had a

twofold higher risk of BCC compared with individuals without a history of burns. A case-control study in the Netherlands found that individuals with a history of severe burns had a threefold higher risk of BCC compared with individuals without a history of burns. A meta-analysis study combining data from several studies found that individuals with a history of severe burns had a 1.5-fold higher risk of BCC compared with individuals without a history of burns. Burns, especially severe burns, may increase the risk of developing BCC through multiple biological mechanisms, including DNA damage, chronic inflammation, and immunosuppression. Existing scientific evidence supports an association between burns and BCC, and further research is needed to understand the underlying mechanisms and develop effective prevention and intervention strategies.⁷⁻¹⁰

Burns are skin injuries caused by heat, chemicals, electricity, or radiation. The severity of burns is classified based on the depth and extent of tissue damage. Severe burns can have a significant impact on multiple organ systems, including the immune system. The immune system is responsible for protecting the body from infection and disease. This system consists of various cells and tissues that work together to detect, attack, and destroy harmful pathogens. Burns, especially severe burns, can suppress the immune system. Burns can directly damage immune cells at the injury site, reducing the number and function of these cells. Burns trigger a strong inflammatory response, which can disrupt the normal function of the immune system. Burns can increase intestinal permeability, allowing bacteria and endotoxins (bacterial toxins) to enter the bloodstream and suppressing the immune system. Burns can cause changes in hormone levels that can suppress the immune system. Basal cell carcinoma (BCC) is the most common skin cancer. BCC develops from basal cells, which are cells that line the deepest layer of the epidermis (outer layer of skin). The immune system plays an important role in detecting and destroying



cancer cells, so suppression of the immune system may increase the risk of developing BCC. Several studies have shown an association between burns and an increased risk of BCC. A cohort study in Finland found that individuals with a history of severe burns had a twofold higher risk of BCC compared with the general population. Another study in the United States found that the risk of BCC was increased by 40% in individuals with a history of severe burns. The specific mechanisms underlying the association between burn injury and BCC are not fully understood. Suppression of the immune system due to burns can make the body more susceptible to the development of cancer cells. Burns can cause DNA damage to skin cells, which can increase the risk of mutations that lead to cancer. The chronic inflammation associated with burns can create an environment conducive to the development of cancer. Burns can suppress the immune system, making individuals more susceptible to infections and cancer. The immune system plays an important role in detecting and destroying cancer cells, so suppression of the immune system may increase the risk of developing BCC. Further research is needed to fully understand the mechanisms underlying the association between burns and BCC and to develop effective prevention and treatment strategies.¹¹⁻¹⁴

Burns are injuries to the skin and underlying tissue caused by heat, chemicals, electricity, or radiation. Burns can range from mild to severe and can cause serious complications, including infection, sepsis, and even death. However, recent research suggests that burns can also have more serious long-term consequences: an increased risk of developing cancer. When the skin burns, a complex inflammatory response occurs. This response involves the release of various growth factors, including epidermal growth factor (EGF), fibroblast growth factor (FGF), and transforming growth factor-beta (TGF- β). These growth factors play an important role in the wound healing process, by stimulating cell proliferation, migration, and differentiation. However, high

concentrations of growth factors released after burns can have the undesirable effect of increasing the risk of developing cancer. Growth factors released after burn injury can activate various signaling pathways involved in the control of cell growth. These signaling pathways, such as the MAPK and PI3K/Akt pathways, play important roles in regulating cell proliferation, differentiation, and apoptosis. Excessive activation of this signaling pathway, which can occur due to high concentrations of growth factors after burn injury, may increase the likelihood of mutation and cellular transformation into cancer. Burns can cause DNA damage to skin cells. This DNA damage can be caused by heat, free radicals produced during the inflammatory process, and carcinogenic agents that may be present in the materials that cause burns. DNA damage can cause mutations in genes involved in the control of cell growth, increasing the likelihood of cellular transformation into cancer. Burns can suppress the immune system, making it more difficult for the body to detect and destroy cancer cells. This can increase the risk of developing cancer because a weak immune system cannot effectively fight mutated cancer cells. Several studies have shown a link between burns and an increased risk of cancer. A cohort study involving more than 1 million people in Denmark found that people who experienced severe burns had a twofold higher risk of developing skin cancer compared with those who had never experienced burns.¹⁵⁻¹⁷ Another study found that people who experienced burns in childhood had a higher risk of developing brain cancer later in life. Although research into the relationship between burns and cancer is still in its early stages, existing evidence suggests that burns may increase the risk of developing cancer. This is likely caused by a combination of factors, including growth factor release, activation of signaling pathways, DNA damage, and immune suppression. A better understanding of the biological mechanisms underlying this relationship may aid in the



development of more effective prevention and treatment strategies for burn-related cancers.¹⁴⁻¹⁶

Burns can vary in severity, from superficial burns that only affect the outer layers of the skin to deep burns that penetrate all layers of the skin and even the underlying tissue. The burn wound healing process involves a complex series of biological events aimed at repairing tissue damage and restoring skin function. However, the healing process for burn wounds is not always perfect. In some cases, burns can leave scar tissue, which is a dense, fibrous area of connective tissue that forms in response to the injury. Scar tissue has a different structure and function than normal skin, and is often more susceptible to damage and disease. One of the significant risks associated with burn scar tissue is an increased risk of developing basal cell carcinoma (BCC), the most common skin cancer. Burn scar tissue has a different structure than normal skin. This structure is characterized by excessive fibroblast proliferation, dysregulated collagen synthesis, and loss of complex skin structures, such as sweat glands and hair follicles. These structural changes result in tissue that is stiff, inelastic, and less hydrated than normal skin. Burn scar tissue often experiences impaired function, such as decreased sensation, thermoregulation, and barrier function. Impaired functioning can make tissues more susceptible to damage from exposure to UV rays, chemicals, and infectious agents. Burns can cause damage to the immune system in the affected area. This damage can interfere with the body's ability to fight infections and cancer. Several studies have shown that burn scar tissue has a lower concentration of immune cells and weaker proliferation ability than normal skin. Burn wounds can activate cellular signaling pathways associated with cell proliferation, migration, and invasion. This signaling pathway may play a role in the development of BCC. Several studies have shown that burn scar tissue has increased expression of proteins associated with oncogenic signaling pathways, such as Ras and ERK. Exposure

to UV rays during the healing process of burn wounds can cause DNA damage to cells in scar tissue. This DNA damage can increase the risk of mutations and the development of cancer. Research shows that burn scar tissue has higher levels of DNA damage than normal skin. Burns and burn scar tissue are associated with an increased risk of developing BCC. Biological factors underlying this relationship include changes in tissue structure, impaired tissue function, impaired immune system, activation of cellular signaling pathways, and DNA damage. A better understanding of these factors may aid in the development of prevention and treatment strategies for BCC in individuals with a history of burn injury.¹⁷⁻¹⁹

Several studies have investigated the relationship between burn injuries and BCC. A large cohort study in the United States found that individuals with a history of severe burns had a 2.5 times higher risk of BCC compared with individuals without a history of burns. Another study in the UK found that individuals with a history of burns at a young age had a 4 times higher risk of BCC. This study suggests that the association between burn injuries and BCC is potentially significant. However, further research is needed to understand the underlying biological mechanisms and to determine the specific risk factors associated with burn injury and BCC development. The findings regarding the association between burns and BCC have important clinical implications. Clinicians should be more alert to the possibility of developing BCC in individuals with a history of burns, especially severe burns. Individuals with a history of burns should perform regular skin self-exams and consult a doctor immediately if they notice any suspicious changes. BCC prevention strategies, such as the use of sunscreen and limiting UV exposure, should be emphasized in individuals with a history of burns. A history of burns is a potential risk factor for the development of basal cell carcinoma (BCC). Research has demonstrated an association between burn injuries and BCC, and several biological



mechanisms have been proposed to explain this association. These findings have important clinical implications and emphasize the importance of BCC prevention in individuals with a history of burn injury.¹⁸⁻²⁰

4. Conclusion

In our case, a 41-year-old woman with a lump (8mm) on her right cheek with telangiectasis. She is often exposed to hot steam when cooking. The management is surgical excision. The histopathology finding refers to nodular basal cell carcinoma (proliferation of basaloid cells arranged in peripheral palisading) and grows to the edge of the tissue. She was sent to the Oncologist for additional surgery or radiotherapy.

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