

THE EPIDEMIOLOGY OF BASAL CELL CARCINOMA AT THE NATIONAL HOSPITAL OF DERMATOLOGY AND VENEREOLOGY IN THE PERIOD 2017-2022

Vu Nguyen Binh^{1,*}, Nguyen Hong Son¹, Nguyen Dinh Quan¹, Nguyen Huu Quang¹,
Le Thanh Hien¹, Nguyen Canh Tung¹, Vu Dinh Tam¹, Ta Thi Ha Phuong¹

ABSTRACT

Objectives: To examine the situation and characteristics of basal cell carcinoma (BCC) and to follow up on and evaluate the effectiveness of treatment methods at the National Hospital of Dermatology and Venereology (NHDV) during the period 2017 - 2022.

Material and methods: Cross-sectional study using data from all patients diagnosed with BCC and treated at NHDV from January 2017 to December 2022.

Results: In the six years from 2017 to 2022, 1133 patients with skin cancer were treated at NHDV, of whom 765 patients had BCC, accounting for 67.5%. The mean age of BCC patients gradually decreased from 65.01 years old in 2017 to 60.2 years old in 2022, and the proportion of patients under 60 years old increased statistically over the years ($p < 0.01$). Among the 387 BCC patients treated at NHDV from January 2020 to December 2022, 317 patients underwent Mohs surgery, accounting for 81.9%, and no recurrence was recorded. Meanwhile, 70 patients underwent wide-local excision (18.1%), and five cases of recurrence were recorded during follow-up.

Conclusions: Basal cell carcinoma is the most common among skin cancers, and patients tend to be younger. Mohs surgery yields good results with the highest cure rate, optimizing the preservation of surrounding healthy skin tissue, maintaining function and aesthetics, and minimizing the recurrence rate.

Keywords: *Skin cancer, basal cell carcinoma, Mohs surgery, recurrence rate.*

¹The National Hospital of Dermatology and Venereology

*Correspondence: vnbinh.90@gmail.com

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INTRODUCTION

Skin cancer is a group of different types of malignancies that involve the growth of abnormal skin cells. Basal cell carcinoma (BCC) is the most common type of skin cancer. BCC is a malignancy consisting of cells that arise from the basal keratinocytes of the epidermis.

Around the world, BCC is most common in Australia (over 1,000/100,000 population/year) and least common in African countries (less than 1/100,000 population/year).¹ In Europe, BCC rates are much lower than those reported in the US and Australia. Asians are less likely to get BCC than Caucasians. The rate of BCC in the Chinese is 18.9/100,000, the Malay is 6.0/100,000, and the Indian is 4.1/100,000.²

BCC is increasing incidence rates worldwide. The rates in Europe have increased approximately 5% annually over recent decades³. In the U.S.A., rates have increased about 2% per year leading to over 2.5 million patients with BCC treated annually.^{3,4} In non-Western regions, such as Asia and South America, incidence rates are ten to hundred-folds lower, but have also increased.^{5,6}

The increase in incidence can be explained by an increased awareness in the general population and among physicians, more surgical treatments, improved registration, an ageing population and changes in the distribution of risk factors such as ultraviolet radiation exposure patterns.⁷ It is believed that the development of BCC occurs in a period of 10 to 50 years after sun damage.⁸ However, the coexistence of BCC and actinic skin lesions as well as the increased risk of occupational chronic exposure to UV rays, such as

that of farmers, also suggest the involvement of chronic exposure to UV rays in the development of BCC, with evidence of the existence of a plateau of cumulative chronic exposure, above which the risk of developing cancer appears not to increase.⁹ Superficial BCCs are more recurrent and are associated with intermittent and intense exposure, while nodular types are more associated with chronic exposure. Pigmented BCC is more frequent in melanoderma patients.^{10,11}

Advancing age is an independent risk factor for BCC with a doubling in incidence from 40 to 70 years.³ The reduced ability to repair the UVR-induced DNA damage with advancing age is considered as the reason for the higher incidence of BCC in older individuals.¹² However, recent years have witnessed a rise in incidence of BCC among those below 40 years.¹³

In recent years, the number of BCC outpatients and inpatients has increased at the National Hospital of Dermatology and Venereology. However, studies on the BCC situation and remission rates are limited. Therefore, we conducted this review to assess the epidemiology of BCC, follow-up, and evaluate the effectiveness of BCC treatment methods at the NHDV from January 2017 to December 2022.

2. MATERIAL AND METHODS

Study design

A cross-sectional study was conducted at NHDV using data collected from the medical records of BCC patients treated at the hospital between 2017 and 2022. We calculated incidence rates of BCC patients, stratified by age, surgery, and recurrence rate.

Subject

Total 765 BCC patients were treated at the Plastic Surgery Department of NHDV from January 2017 to December 2022. All patients were histopathologically examined and diagnosed with BCC.

Statistical analysis

The data was encrypted and analyzed based the statistical algorithm with the SPSS 20.0. The use the T test and the Chi square test compared the difference between means and prevalence. The difference was considered to be statistically significant at $p < 0,05$.

Ethical approval

The study was approved by the Ethical Review Board of the National Hospital of Dermatology and Venereology, Vietnam and written informed consent was obtained from all subjects before their enrolment in the study.

3. RESULTS

3.1. Epidemiological distribution

Among 1133 patients with skin cancer, there are 765 patients with BCC, accounting for the highest rate of 67.5% (Figure 1).

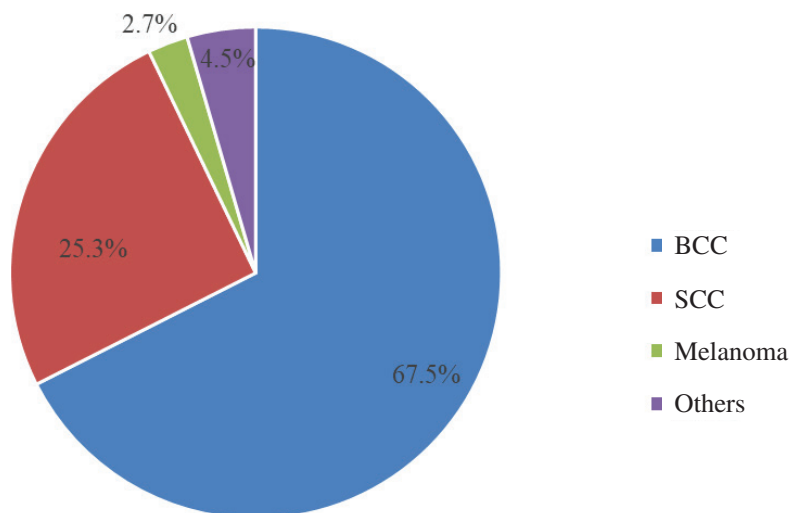


Figure 1. Cancer types distribution in the period 2017 - 2022

Figure 2 shows the total number of cancer patients and the proportion of basal cell carcinoma tends to increase gradually in the period from 2017 to 2019, gradually decrease in 2 years from 2020 to 2021 then increase again in 2022.

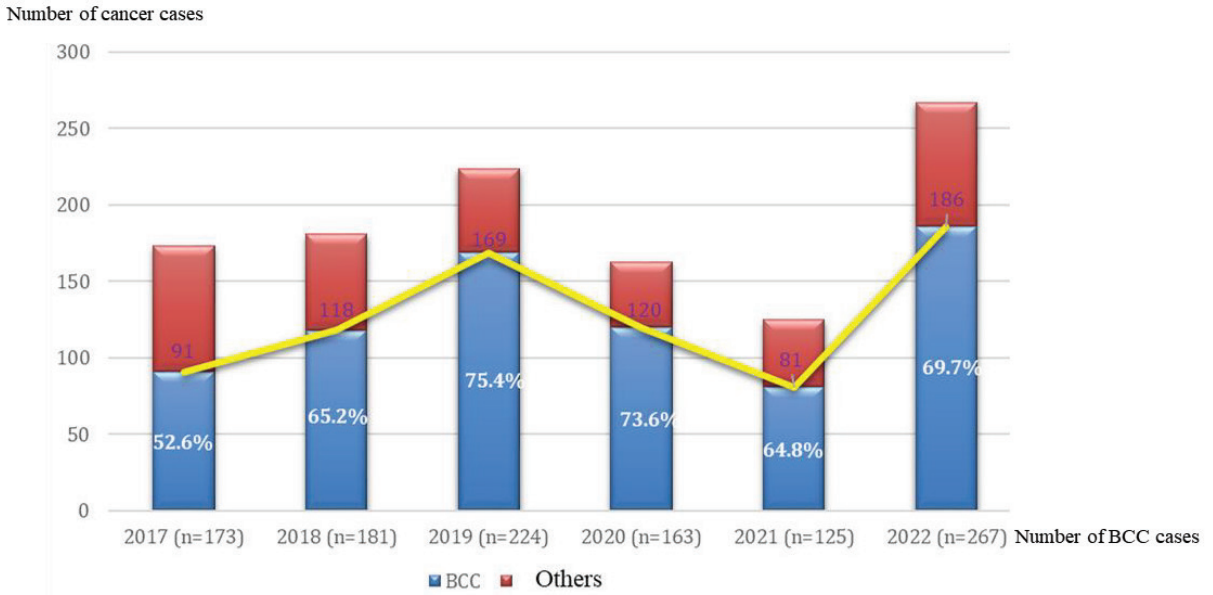


Figure 2. Numbers and proportion of BCC patients over the years

Figure 3 shows the mean age of BCC patients in the period from 2017 to 2022. The mean age of BCC patients gradually decreases over the years with statistical significance from 65.01 years old in 2017 to 60.2 years old in 2022, with $p < 0.05$.

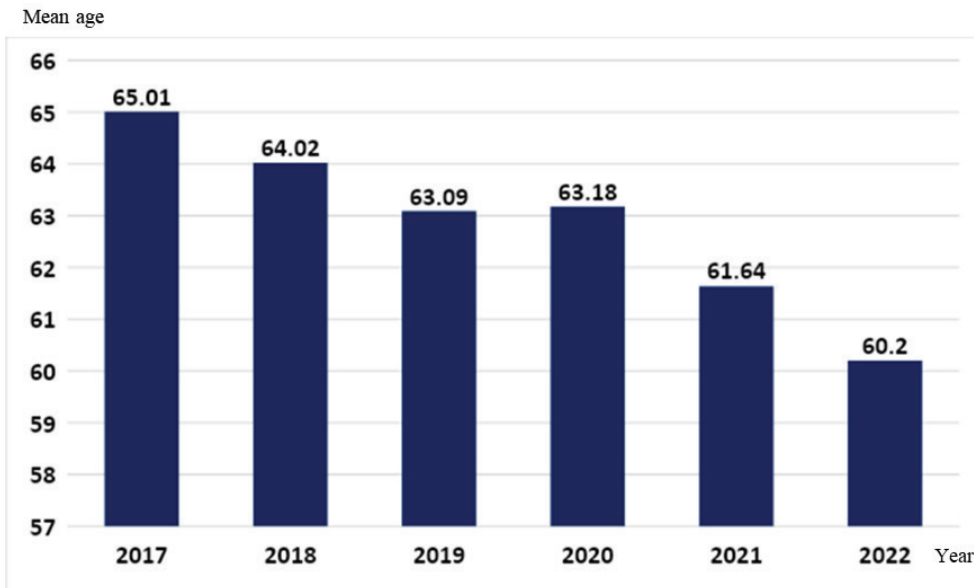


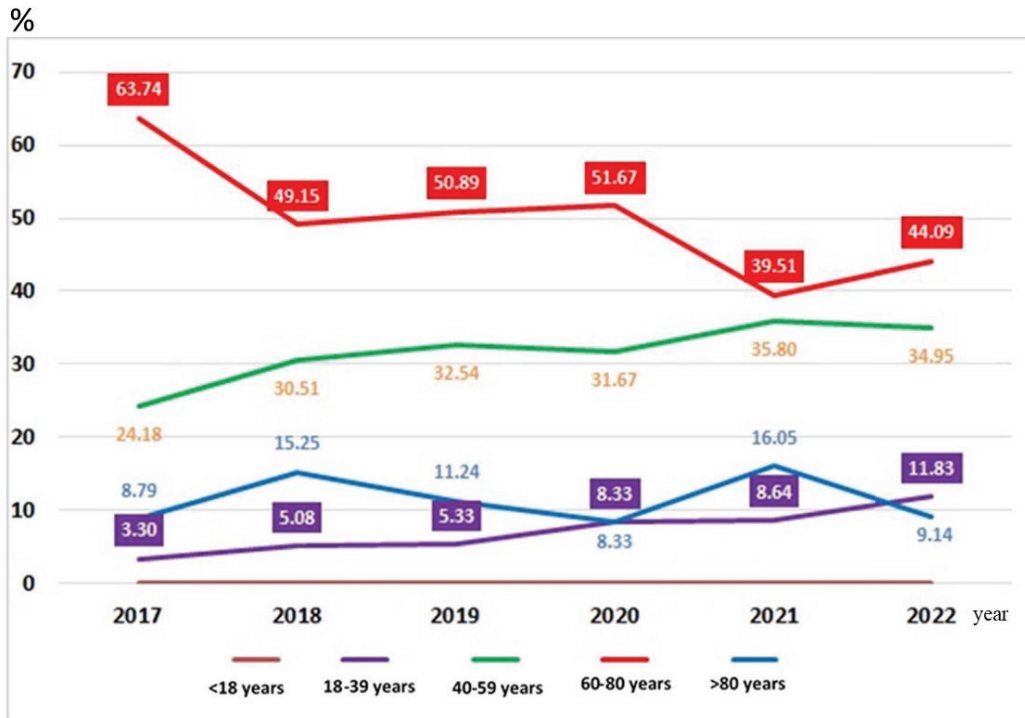
Figure 3. BCC patients mean age

BCC rates tend to increase with age, in which the 60 - 79 age group has the largest number (386 patients) accounting for 50.5% and the 40 - 59 age group has the second largest number (237 patients) accounting for 31.0% (as shown in Table 1).

Table 1. The distribution of age in BCC patients

Age group	n	%
< 18 years	0	0
18 - 39 years	57	7.5%
40 - 59 years	237	31.0%
60 - 79 years	386	50.5%
≥ 80 years	85	11.1%
Total	765	

Figure 4 shows that the 60 - 79 age group accounted for the highest percentage but in the decreasing trends, while the under-40 and 40 - 59 years groups have increased gradually over the years. In particular, no cases under 18 years old were recorded. The young age group from 19 - 40 has seen significant increases from 3.3% (in 2017) to 11.83% (in 2022).


Figure 4. BCC patient's mean age changes and age distribution from 2017 to 2022



3.2. Treatment characteristics

Follow-up treatment in the period 2020-2022, there are 387 BCC patients with the characteristics showed in Figure 5. From 2020 to 2022, Mohs surgery is more popular than wide-local excision with an overall rate of 81.9% while wide-local excision accounted for 18.1%.

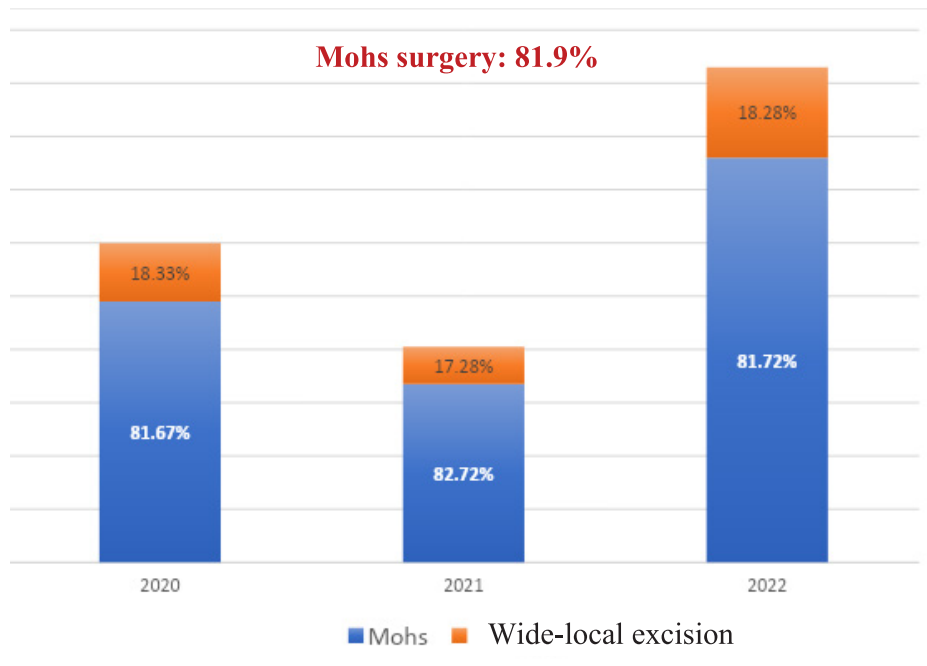


Figure 5. The proportion of surgical methods over the year (n = 387)

In the Mohs surgery group, after there were no more cancer cells on the histopathology, we measured the defect's size relative to the tumor margin to compare the effectiveness with wide-local excision. After Mohs surgery, 12 patients were resected and controlled for cancer with the width of the defect from the edge of the tumor larger than 5mm, accounting for 3.8% (as shown in Table 2).

Table 2. The surgical defects size after Mohs surgery

	n	%
≤ 5mm	305	96.2%
> 5mm	12	3.8%
Total	317	0

3.3. Recurrence characteristics

Figure 6 shows there is no recurrence of BCC after Mohs surgery and BCC recurrence rate after wide-local excision is 2.9%.

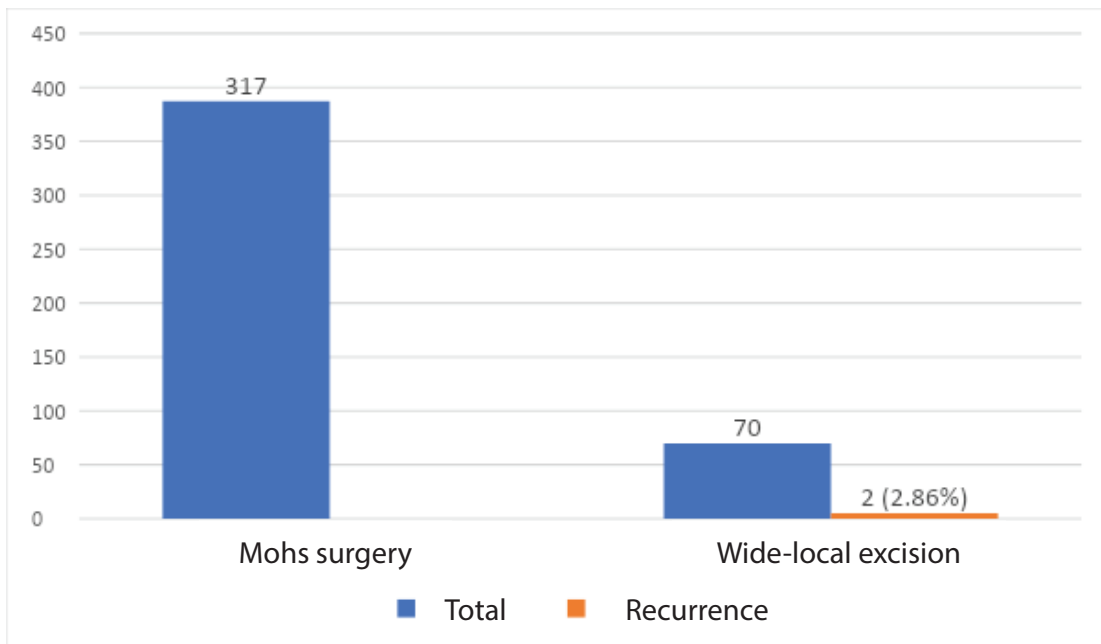


Figure 6. Recurrence rate of BCC surgical treatment

4. DISCUSSION

During the 6-year period from 2017 to 2022, 765 patients with basal cell carcinoma were diagnosed and treated at the National Hospital of Dermatology and Venerology. Basal cell carcinoma is the type of skin cancer that accounts for the highest rate of skin cancers these days, with a rate of 67.52% (Figure 1). This rate is quite similar to the study by A. Vila-Payeras et al in 2020 on 433 skin cancer patients with a basal cell carcinoma rate of 68.4%.¹⁴

During the period from 2017 to 2019, the number of BCC patients increased over the years, from 91 patients in 2017 to 118 patients in 2018 and then to 169 patients in 2019 (Figure 2). Thanks to the policy of strengthening and propaganda in the healthcare field in general and the dermatology sector in particular, many patients went for examination after suspicious signs and were diagnosed with BCC. At the same

time, the National Hospital of Dermatology and Venerology has implemented many skin cancer treatments which give good results, including the Mohs technique. This technique allows to determine and completely resect the cancer tissue perioperative by controlling histopathology under the microscope, while sparing normal, uninvolved tissue and minimizing the recurrence rate. Therefore, many patients were referred for treatment. However, the number of patients gradually decreased in the next 2 years, down to 120 patients in 2020 and only 81 patients in 2021 (Figure 2). This is due to the emergence and spreading of the SARS-CoV-2 epidemic in 2020 - 2021. The policy of isolation, zoning, and travel restrictions makes it difficult for patients to go to the hospital for examination. Only those who live near the hospital, are not in an isolated area, or those with critical conditions with function defects, were allowed to come for examination and treatment. Therefore, by 2022, when the SARS-



CoV-2 epidemic situation has been stabilized, the number of BCC patients coming for examination and treatment increases again to 186 patients, reaching the highest number in the research years.

The common age of basal cell carcinoma is over 60 years old, accounting for 61.57%, of which 60 - 79 age group is the most common, accounting for 50.46% (Table 1). During the process of life, the human body is always under the influence of carcinogenesis which causes changes to DNA at the molecular level. These changes are usually corrected by the body to ensure normal cell development. In elder people, the body's repairing ability is weakened, thus mutated cells grow abnormally and become malignant. This can be explained by the high rate of skin cancer patients in retirement age.

Patients diagnosed with BCC mean age gradually decreased over the years from 65.01 years old in 2017 to 60.2 in 2022, this difference was statistically significant with $p < 0.05$ (Figure 3). The decreasing trend of BCC-diagnosed mean age may thank to the policy of propaganda in the dermatology sector in recent times, patients actively go for examination and treatment as soon as they detect any warning signs. Notably, the proportion of the under-40 age group and the 40 - 59 age group increased significantly from 3.3% in 2017 to 11.83% in 2022 and 24.18% in 2017 to 34.95% in 2022, respectively ($p < 0.01$) (Figure 4). This trend of younger BCC patients was also mentioned in a study by Christenson et al in 2005 on 417 under-40-year-old patients in the period 1976 - 2003. The study shows the incidence in the population younger than 40 years increased gradually over the years, from 35 patients in the period 1976 - 1979 to 86 patients in the period 2000 - 2003 ($p < 0.001$).¹⁵

Surgery remains the most effective treatment for basal cell carcinoma. Currently, there are two commonly used methods: Mohs surgery and wide-local excision. In the period from 2020 to 2022, Mohs surgery was the most applied method with an average rate of 81.91% while wide-local excision only accounted for 18.09%. Mohs surgery is still considered the gold standard of basal cell carcinoma treatment because it can control the entire area of cancer resection and minimize the recurrence rate of the tumor. Thus, Mohs surgery is widely common. However, in some cases, in which the patient is too old and weak, has many critical complications or cannot endure prolonged surgery; or in some oversized BCC lesions, Mohs surgery might be prolonged and very costly due to the length and cost of the intraoperative frozen section, thus causing an economic burden for patients. Therefore, these patients still underwent wide-local excision to shorten the surgical time, minimize the risks during the anesthetic resuscitation phase and also reduce the cost of surgery and the economic burden for patients.

The standard for wide-local excision is to excise a lesion with a margin width from 5mm, while Mohs surgery is a methodical technique that examines 100% of the tumor margin to resect the cancerous tissue until achieving a normal, uninvolved tissue plane. In some cases, when the margin of BCC is not clear and the tumor is highly invasive, Mohs surgery has an advantage over wide-local excision when it can control cancer cells and apply on a larger size than the standard for wide-local excision. Among 317 patients who underwent Mohs surgery, 12 patients had defects after Mohs surgery larger than 5mm tumor margin, accounting for 3.8%. In case Mohs surgery is not used, but the wide-local excision, the likelihood of cancer recurrence in these patients is very high.

During the study period from 2020 to 2022, when examining and re-evaluating patients who underwent surgical treatment for basal cell carcinoma, there were no cases of recurrence in patients undergoing Mohs surgery. There were 2 patients detected with recurrent BCC and treated, both underwent wide-local excision, accounting for 2.86%. This result is similar to the study of Staub G. et al. 2008 with a recurrence rate of BCC of 3.8%.¹⁶

5. CONCLUSION

A study on 765 patients with basal cell carcinoma examined and treated at the National Hospital of Dermatology and Venerology for 6 years from 2017 to 2022 shows an increasing trend in the number of BCC patients. Basal cell carcinoma is the most common among patients with skin cancer, with a proportion of 67.52%. Of these, 61.57% of patients are over 60 years old. Patients with basal cell carcinoma tend to be younger with the mean age gradually decreasing from 65.01 years in 2017 to 60.2 in 2022. At the same time, the proportion of under-40 and 40 - 59 patients increases gradually over the years. Mohs surgery comprise a higher rate with 81.91% and no recurrence cases were recorded. There are 2 cases of BCC recurrence, both underwent wide-local excision.

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