

นิพนธ์ต้นฉบับ

แนวโน้มของลักษณะผู้ป่วย อุบัติการณ์ แนวทางการรักษา และผลการรักษาของผู้ป่วยโรคมะเร็งผิวหนังเมลาโนมาในโรงพยาบาลสระบุรี: การศึกษาย้อนหลัง 15 ปี

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บทคัดย่อ

บทนำ: มะเร็งผิวหนังเมลาโนมาเป็นมะเร็งผิวหนังที่เกิดจากความผิดปกติของเซลล์เม็ดสีเมลาโนไซต์ และเป็นหนึ่งในโรคมะเร็งผิวหนังที่ทำให้ผู้ป่วยเสียชีวิตได้ซึ่งจากการศึกษาในปัจจุบันพบว่าอุบัติการณ์ของมะเร็งผิวหนังเมลาโนมากำลังเพิ่มขึ้นทั่วโลกแต่อัตราการรอดชีวิตก็กำลังเพิ่มขึ้นเช่นกัน การศึกษานี้มี **วัตถุประสงค์การศึกษา:** เพื่อประเมินแนวโน้มลักษณะของผู้ป่วยอุบัติการณ์อาการแสดงลักษณะทางพยาธิวิทยา ระยะของโรค การแพร่กระจายการรักษาและผลการรักษาของผู้ป่วยโรคมะเร็งผิวหนังเมลาโนมาในโรงพยาบาลสระบุรีตั้งแต่ปี 2551 ถึง 2566 **วิธีการศึกษา:** โดยศึกษาย้อนหลังจากเวชระเบียนของผู้ป่วยที่ได้รับการวินิจฉัยมะเร็งผิวหนังเมลาโนมาด้วยชิ้นเนื้อพยาธิวิทยาที่เข้าเกณฑ์ทั้งหมด 50 รายนำข้อมูลมาวิเคราะห์ทางสถิติ **ผลการศึกษา:** พบว่าเป็นเพศหญิงจำนวน 33 รายเพศชาย 17 ราย ในช่วงปีที่มีการระบาดของโควิดร่วมกับมาตรการปิดเมืองพบว่ามีจำนวนผู้ป่วยที่ได้รับการวินิจฉัยมะเร็งผิวหนังเมลาโนมาลดลงและกลับมาเพิ่มขึ้นหลังสถานการณ์การระบาดดีขึ้น โดยสัดส่วนของผู้ป่วยเพศหญิงมากกว่าเพศชายในเกือบทุกช่วงปี ส่วนค่ามัธยฐานอายุของผู้ป่วยในช่วงเวลาที่ได้รับการวินิจฉัยค่อนข้างคงที่อาการแสดงที่พบได้บ่อยเป็นรอยโรคที่มีสีดำ (Blackish lesion) และรอยแผล (Ulcer) ตำแหน่งที่พบบ่อยคือ รยางค์ส่วนล่างและประเทหะเร็งผิวหนังเมลาโนมาที่พบบ่อยคือ acral lentiginous ข้อมูลทางพยาธิวิทยาพบว่า Breslow thickness มากกว่า 4 มิลลิเมตรและ Clarke level 4 มากที่สุด 5 year-survival rate ของการศึกษานี้อยู่ที่ 10% สัดส่วนผู้ป่วยมะเร็งผิวหนังเมลาโนมาในระยะที่ 3 **สรุปผล:** สัดส่วนผู้ป่วยที่รอดชีวิตภายในระยะเวลา 5 ปี หลังวินิจฉัยมีแนวโน้มเพิ่มขึ้นและสัดส่วนผู้ป่วยที่เสียชีวิตจากมะเร็งผิวหนังเมลาโนมาภายในระยะเวลา 5 ปีลดลง

คำสำคัญ ● มะเร็งผิวหนังเมลาโนมา ● อุบัติการณ์อัตราการรอดชีวิต ● ย้ายย้ายการทำงานที่อิมมูโนเช็กพอยต์ ● การรักษาแบบมุ่งเป้าด้วยยา

เวชสารแพทย์ทหารบก. 2568;78(3):217-30.

Original article

Trends in characteristics, incidence, and outcomes of cutaneous malignant melanoma in Saraburi hospital: A 15-year retrospective study

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Abstract

Background : Cutaneous malignant melanoma is a malignant skin tumor that originates from melanocytes. It is one of the aggressive tumors with a significant mortality rate. While the incidence of cutaneous malignant melanoma is increasing worldwide, the mortality rate is decreasing. These interesting trends in incidence and mortality rate may be attributed to improved patients' knowledge and awareness of cutaneous malignant melanoma, as well as the role of novel therapies such as immune checkpoint inhibitors and targeted therapy. In Thailand, there are few studies that focus on cutaneous malignant melanoma. **Objective :** To evaluate trends in the characteristics, incidence, and outcomes of cutaneous malignant melanoma at Saraburi Hospital. **Methods :** This is a 15-year retrospective study involving patients diagnosed with melanoma skin cancer. Medical records and pathology databases at Saraburi Hospital were reviewed from January 1, 2008, to July 1, 2023. **Results :** A total of 50 cases of cutaneous malignant melanoma were found (33 female, 17 male). There was a decreased number of cutaneous malignant melanoma diagnoses during the COVID-19 pandemic with lockdown measures in 2020. There was no significant change in trends in age, most common clinical manifestations (blackish lesion and ulcer), location (lower extremities), type (acral lentiginous), and histological findings (Breslow thickness > 4 mm and Clarke level 4). The 5 year-survival rate was 10% [0.10(0.04-0.20)]. Trends in melanoma staging shows an increasing in stage 3. **Conclusions :** Trends in the 5-year survival rate show an increased proportion of patients who are alive but a decreased number of patients who died from malignant melanoma.

Keywords : ● cutaneous malignant melanoma ● incidence, survival rate
● immune checkpoint inhibitors ● targeted therapy

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Introduction

Cutaneous malignant melanoma is a skin cancer arising from abnormal melanocytes, melanin pigment-producing cells located in epidermis. It is classified into various subtypes based on growth patterns, including: 1. Superficial Spreading Melanoma (SSM), 2. Nodular Melanoma (NM), 3. Lentigo Maligna Melanoma (LMM), 4. Acral Lentiginous Melanoma (ALM), 5. Desmoplastic Melanoma (DM), and 6. Mixed Epithelioid and Spindle Cell Melanoma. Among these, superficial spreading melanoma is the most commonly found type in individuals with fair skin, while acral lentiginous melanoma (ALM) is most prevalent among Asian, African, and Hispanic populations. Another form of malignant melanoma is mucosal melanoma, which affects mucous membranes.^{1,2}

The incidence of cutaneous malignant melanoma has been rising worldwide, especially in countries with predominantly fair-skinned populations. Globally, melanoma ranked as the 20th most common cancer in 2018, with an estimated 287,723 new cases and 60,712 deaths.³ In Thailand, from 2010 to 2019, the annual incidence of melanoma was approximately 0.52 cases per 100,000 people, which is relatively low compared to the United States, where the incidence is 15 cases per 100,000. However, the mortality rate in Thailand is 0.25 deaths per 100,000 people (48.08%), which is considered relatively high.¹

The prognosis depends on the stage of melanoma. The 5-year survival rates are: stage IA: 99%, stage IIIA: 93%, stage IIID: 32%, and stage IV: 10%.² Current treatment strategies depend on its stage. Surgical excision remains the standard treatment, often combined with adjuvant therapies (radiation or chemotherapy). In recent years, newer therapies have emerged, including interferon (IFN), immune checkpoint inhibitors (e.g., anti-CTLA-4 antibody, anti-PD-1 antibody, and anti-PD-L1 antibody), and targeted therapies like BRAF inhibitors and neoantigen melanoma vaccines.^{2,4} Many studies indicate that immune checkpoint inhibitors and targeted therapies, such as Pembrolizumab, significantly reduce melanoma recurrence and mortality (hazard ratio 0.61, 95% CI, 0.45–0.82).^{2,6} Given the limited research on melanoma in Thailand, this study aims to explore trends, patient characteristics, incidence, clinical presentations, treatment modalities, and outcomes of melanoma patients treated at Saraburi Hospital.

Objectives

To evaluate trends, patient characteristics, incidence, clinical presentations, disease stages, metastasis, treatment, and outcomes of melanoma skin cancer patients at Saraburi Hospital from 2008 to 2023.

Table 1 summarizes the characteristics of patients diagnosed with melanoma skin cancer at Saraburi Hospital from 2008 to 2023.

Year of diagnosis	2 0 0 8 - 2011 n = 10	2 0 1 2 - 2014 n = 7	2 0 1 5 - 2017 n = 13	2 0 1 8 - 2020 n = 4	2 0 2 1 - 2023 n = 16
Age, year					
- Minimal	31	53	47	37	34
- Mean	67	82	62	53.5	66
- Maximal	91	89	89	79	91
Gender, n (%)					
- Female	6 (60)	5 (71.4)	6 (46.2)	2 (50)	14 (87.5)
- Male	4 (40)	2 (28.6)	7 (53.8)	2 (50)	2 (12.5)
Location, n (%)					
- Head and neck	0 (0)	0 (0)	0 (0)	0 (0)	1 (6.3)
- Trunk	0 (0)	1 (14.3)	1 (7.7)	0 (0)	2 (12.5)
- Upper extremities	1 (10)	0 (0)	2 (15.4)	1 (25)	2 (12.5)
- Lower extremities	9 (90)	6 (85.7)	9 (69.2)	3 (75)	11 (68.8)
- Unknown	0 (0)	0 (0)	1 (7.7)	0 (0)	0 (0)
Clinical presentations, n (%)					
- Blackish lesion	2 (20)	2 (28.6)	4 (30.8)	0 (0)	7 (43.8)
- Ulcer	4 (40)	2 (28.6)	1 (7.7)	2 (50)	5 (31.3)
- Mass	1 (10)	1 (14.3)	5 (38.5)	0 (0)	0 (0)
-Blackish ulcer	2 (20)	2 (28.6)	1 (7.7)	0 (0)	1 (6.3)
- Ulcerated mass	1 (10)	0 (0)	2 (15.4)	1 (25)	1 (6.3)
- Growing nevi	0 (0)	0 (0)	0 (0)	1 (25)	0 (0)
- Others	0 (0)	0 (0)	0 (0)	0 (0)	2 (12.5)
Subtype, n (%)					
- Superficial spreading	0 (0)	0 (0)	0 (0)	0 (0)	1 (6.3)
- Nodular	1 (10)	0 (0)	2 (15.4)	1 (25)	1 (6.3)
- Acral lentiginous	8 (80)	6 (85.7)	6 (46.2)	3 (75)	11 (68.8)
- Amelanotic	0 (0)	0 (0)	1 (7.7)	0 (0)	2 (12.5)
- In Situ	0 (0)	0 (0)	1 (7.7)	0 (0)	0 (0)

Table 1 summarizes the characteristics of patients diagnosed with melanoma skin cancer at Saraburi Hospital from 2008 to 2023.(cont.)

Year of diagnosis	2 0 0 8 - 2011 n = 10	2 0 1 2 - 2014 n = 7	2 0 1 5 - 2017 n = 13	2 0 1 8 - 2020 n = 4	2 0 2 1 - 2023 n = 16
- Others	0 (0)	0 (0)	3 (23)	0 (0)	1 (6.3)
- Unknown	1 (10)	1 (14.3)	0 (0)	0 (0)	0 (0)
Time to diagnosis, month					
- Minimal	1	2	3	2	1
- Maximal	15	60	60	24	36
- Mean	12	24	6	3	12
Breslow thickness, n (%)					
- <1 mm.	0 (0)	0 (0)	0 (0)	0 (0)	2 (12.5)
- 1-2 mm.	0 (0)	0 (0)	0 (0)	0 (0)	2 (12.5)
- 2.01-4 mm.	1 (10)	1 (14.3)	0 (0)	0 (0)	3 (18.7)
- >4 mm.	8 (80)	1 (14.3)	2 (15.4)	2 (50)	8 (50)
- Unknown	1 (10)	5 (71.4)	11 (84.6)	2 (50)	1 (6.3)
Clarke level, n (%)					
- 1	0 (0)	0 (0)	0 (0)	0 (0)	0
- 2	0 (0)	0 (0)	0 (0)	0 (0)	0
- 3	0 (0)	0 (0)	0 (0)	1 (25)	3 (18.8)
- 4	3 (30)	2 (28.6)	2 (15.4)	1 (25)	5 (31.1)
- 5	2 (20)	2 (28.6)	1 (7.7)	0 (0)	2 (12.5)
- Unknown	5 (50)	3 (42.9)	10 (76.9)	2 (50)	6 (37.5)
Ulceration, n (%)					
- Yes	2 (20)	1 (14.3)	4 (30.7)	3 (75)	7 (43.8)
-No	6 (60)	2 (28.6)	5 (38.4)	0 (0)	8 (50)
- Unknown	2 (20)	4 (57.1)	4 (30.7)	1 (25)	1 (6.2)
Mitosis, n (%)					
-Yes	0 (0)	0 (0)	1 (7.7)	1 (25)	9 (56.3)
-No	7 (70)	1 (14.3)	5 (38.4)	1 (25)	4 (25)
-Unknown	3 (30)	6 (85.7)	7 (53.9)	2 (50)	3 (18.7)
Stage, n (%)					
- In situ	1 (10)	0 (0)	1 (7.7)	0 (0)	1(6.2)

Table 1 summarizes the characteristics of patients diagnosed with melanoma skin cancer at Saraburi Hospital from 2008 to 2023.(cont.)

Year of diagnosis	2 0 0 8 - 2011 n = 10	2 0 1 2 - 2014 n = 7	2 0 1 5 - 2017 n = 13	2 0 1 8 - 2020 n = 4	2 0 2 1 - 2023 n = 16
-Stage I	0 (0)	0 (0)	0 (0)	1 (25)	3 (18.6)
IA	0(0)	0 (0)	0 (0)	0 (0)	1 (6.2)
IB	0 (0)	0 (0)	0 (0)	1 (25)	2(12.4)
-Stage II	3 (30)	2 (28.6)	3 (23.1)	2 (50)	6 (37.6)
IIA	0 (0)	1 (14.3)	1 (7.7)	1 (25)	0 (0)
IIB	2 (20)	1 (14.3)	0 (0)	1(25)	3 (18.8)
IIC	1 (10)	0 (0)	2 (15.4)	0 (0)	3 (18.8)
-Stage III	1(10)	0 (0)	3 (23.1)	1 (25)	6 (37.6)
IIIA	0 (0)	0 (0)	1 (7.7)	0(0)	0 (0)
IIIB	1 (10)	0 (0)	1 (7.7)	0 (0)	3 (18.8)
IIIC	0 (0)	0 (0)	1 (7.7)	1 (25)	3(18.8)
IIID	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- Stage IV	0 (0)	1 (14.3)	0 (0)	0 (0)	0 (0)
- MUP*	0 (0)	0 (0)	2 (15.4)	0 (0)	0 (0)
- Unknown	5 (50)	4 (57.1)	4 (30.7)	0 (0)	0 (0)
Lymph node metastases (%)					
- Yes	1 (10)	1 (14.3)	5 (38.7)	1 (25)	6 (37.5)
- No	3 (30)	2 (28.6)	5 (38.7)	2 (50)	10 (62.5)
- Unknown	6 (60)	4 (57.1)	3 (23)	1 (25)	0 (0)
Organ metastases, n (%)					
- Yes	1 (10)	1 (14.3)	0 (0)	1(25)	0 (0)
- No	9 (90)	6 (85.7)	13 (100)	3(75)	16 (100)
- Unknown	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
SLNB ⁺ , n (%)					
- Yes	4 (40)	3 (42.9)	6 (46.2)	3 (75)	16 (100)
- No	6 (60)	4 (57.1)	5 (38.4)	1 (25)	0 (0)
- Unknown	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- MUP*	0 (0)	0 (0)	2 (15.4)	0 (0)	0 (0)
Treatment, n (%)					

Table 1 summarizes the characteristics of patients diagnosed with melanoma skin cancer at Saraburi Hospital from 2008 to 2023.(cont.)

Year of diagnosis	2 0 0 8 - 2011 n = 10	2 0 1 2 - 2014 n = 7	2 0 1 5 - 2017 n = 13	2 0 1 8 - 2020 n = 4	2 0 2 1 - 2023 n = 16
- Excision	10(100)	6 (85.7)	6 (84.6)	2 (50)	9 (56.3)
- Amputation	0 (0)	1 (14.3)	2 (15.4)	1 (25)	3 (18.8)
- Excision + Radiation	0 (0)	0 (0)	4 (30.8)	0 (0)	2 (12.5)
- Excision + Chemotherapy	0 (0)	0 (0)	1 (7.6)	0 (0)	1 (6.2)
- Excision + Anti-PD-1	0 (0)	0 (0)	0 (0)	1 (25)	1 (6.2)
Outcomes, n (%)					
- Alive	0 (0)	0 (0)	4 (30. 7)	0 (0)	12 (75)
-Death from melanoma	1 (10)	0 (0)	0 (0)	1 (25)	1 (6.2)
-Death from other cause	0 (0)	0 (0)	1 (7.7)	0 (0)	0 (0)
- Recurrence but still alive	2 (20)	2 (28.2)	2 (15.4)	2 (50)	2 (12.5)
-Recurrence and death from melanoma	2 (20)	1 (14.3)	0 (0)	0 (0)	0 (0)
- Loss follow up	5 (50)	4 (57.1)	6 (46.2)	1 (25)	1 (6.2)

MUP* – Melanoma of unknown primary

SLNB[†]- Sentinel lymph node biopsy

Materials and Methods

This is a retrospective study involving patients diagnosed with cutaneous malignant melanoma at Saraburi Hospital by pathological findings during January 1, 2008, to July 1, 2023. A total of 50 cases with a pathological diagnosis of cutaneous malignant melanoma were included. Patients diagnosed with mucosal malignant melanoma and those lacking physical examination or treatment information at the time of melanoma diagnosis in the hospital records were excluded. Data were collected using medical records review and pathology databases extraction. Patient demographics (age, gender), year of diagnosis, clinical presentations, lesion locations, and duration of symptoms before diagnosis. Subtype, staging (American Joint Committee on Cancer [AJCC] staging system), pathological findings (ulceration, Breslow thickness, Clark level, and mitotic rate), metastases, treatments, and outcomes were assessed via CT scans (brain, lungs, and abdomen) within 5 years of diagnosis. Descriptive statistics were used to summarize data, categorizing patients by year of diagnosis and general characteristics such as age, clinical presentations, lesion types, locations, and melanoma stages. Pathological features like ulceration, Breslow thickness (measuring

from the topmost granular layer of the epidermis to the deepest point of melanoma), Clark level (anatomic level of invasion), and mitotic rate (number of dividing cells in the tumor) were described. Data on metastasis, sentinel lymph node biopsy (SLNB), lymph node involvement, treatments, and outcomes (1–5-year survival rates) were presented as counts and percentages. Statistical analysis was performed using Stata version 17.0. The Kaplan-Meier curve was used to calculate and display the 5-year survival rates of melanoma patients.

Ethical Considerations

This study was reviewed and approved by the Human Research Ethics Committee of Saraburi Hospital (Approval No. EC042/2566), with approval granted on September 18, 2023.

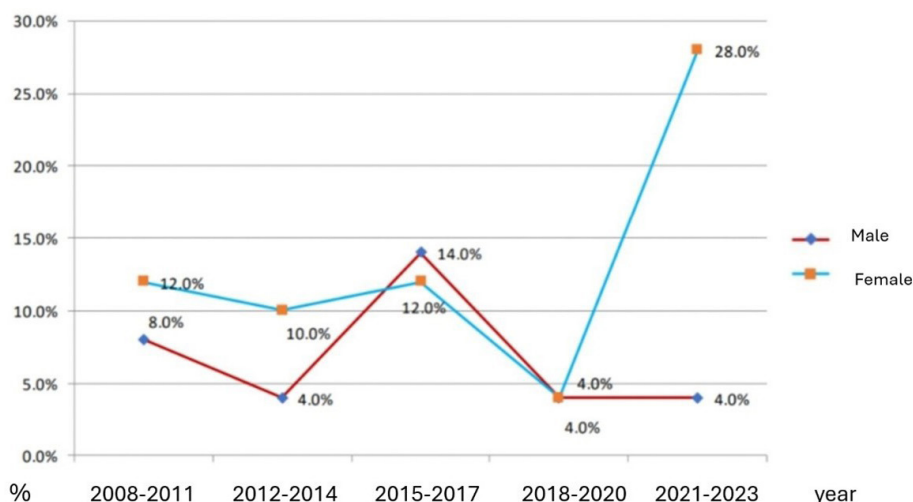
Results

From the review of the pathology database at Saraburi Hospital between January 1, 2008, and July 1, 2023, a total of 140 melanoma cases were identified through pathological diagnosis. After removing duplicate records, 88 cases remained. Applying the exclusion criteria (patients diagnosed with mucosal melanoma and those with incomplete physical examination in the medical records), the final sample was 50 patients.

From 2009 to 2023, there were 50 cutaneous malignant melanoma patients identified. Of these, 33 were female (66%), and 17 were male (34%), with females being the majority in almost every year (figure 1). The median age at diagnosis remained relatively stable but showed a slight increase to 82 years during 2012–2014. Clinical presentations, lesion locations, and subtypes remained consistent throughout the study period. The most common presentations were blackish lesion and ulcer, with the most frequent location being the lower extremities. The most common subtype was acral lentiginous melanoma. Median duration from symptom onset to diagnosis decreased to 6 months and 3 months during 2015–2020, but increased again to 12 months during 2021–2023.

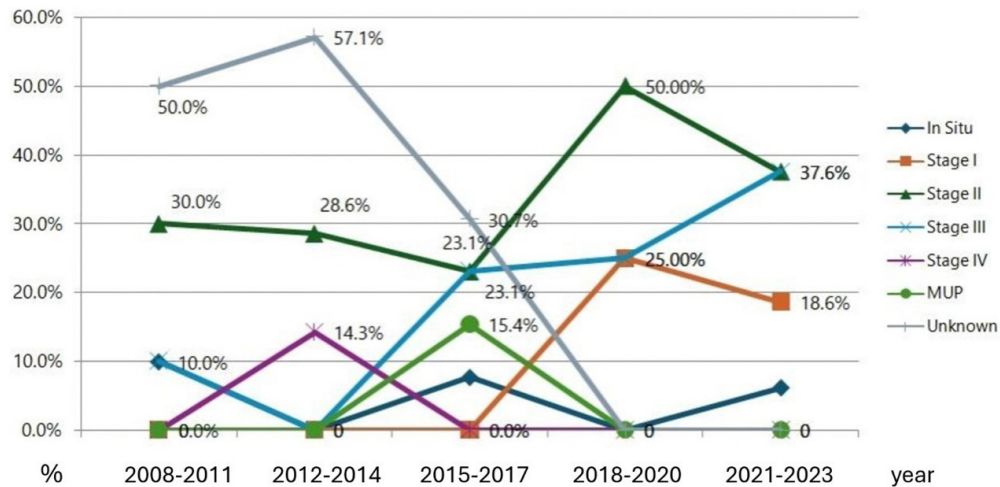
Figures:

Figure 1: Proportion of melanoma skin cancer patients by gender at Saraburi Hospital (2008–2023).



The number of new melanoma cases from 2008–2023 remained relatively steady, except during 2018–2020, when only 4 cases were reported. Regarding disease stages, there was an increase in stage III melanoma cases, from 10% during 2008–2011 to 37.6% during 2021–2023 (figure 2). Meanwhile, the proportion of patients with an unknown stage decreased from 50% during 2008–2011 to 0% during 2018–2023.

Figure 2: Proportion of melanoma skin cancer patients by stage at Saraburi Hospital (2008–2023).



Metastasis to other organs was rare. One case of lung metastasis was reported in 2013, and one case of brain and bone metastasis was reported in 2018.

Regarding pathological findings, the majority of melanoma cases had a Breslow thickness greater than 4 mm. and Clarke level 4. The proportion of pathology specimens with unspecified Breslow thickness and Clarke level decreased from 50% in 2008–2011 to 37.5% in 2021–2023. The presence of mitotic figures in tumor specimens increased to 56.3% in 2021–2023.

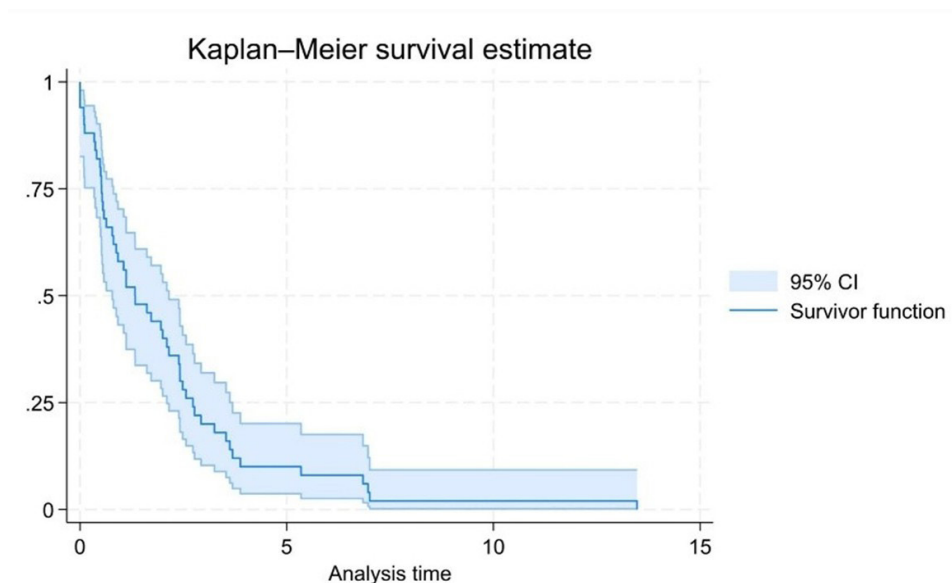
There has been a significant increase in Sentinel Lymph Node Biopsy (SLNB), from 40% during 2008–2011 to 75% during 2018–2020, and reached 100% in 2021–2023.

Surgical excisions were performed in all patients as the first-line treatment. 8 patients received radiation therapy following surgery between 2015 and 2023. 2 patients received adjuvant chemotherapy after surgery (1 stage IIIA patient in 2016 and 1 stage IIIC patient in 2022). 2 patients were treated with immune checkpoint inhibitors, anti-PD-1 (1 stage IIC patient with recurrence after 2 years in 2019 and 1 stage IIIC patient in 2021), other stage III patients received only surgery.

There has been an increase in the proportion of melanoma patients surviving without recurrence within 5 years of diagnosis, rising to 75% in 2021–2023. Conversely, the proportion of melanoma recurrences within 5 years has decreased from 40% in 2008–2011 to 12.5% in 2021–2023. The proportion of patients who died from melanoma within 5 years of diagnosis has also declined, from 30% in 2008–2011 to 6.2% in 2021–2023. Additionally, the proportion of patients lost to follow-up has decreased from 50% in 2008–2011 to 0% in 2021–2023. Interestingly, the following outcomes of 2 patients treated with immune checkpoint inhibitors (anti-PD-1), were 1

stage IIC patient with recurrence in 2019 remained alive after five years of follow-up and 1 stage IIIC patient treated in 2021 also survived beyond 5 years after diagnosis. The 5-year survival rate for melanoma patients in this study was 10%, as shown in figure 3.

Figure 3: Kaplan-Meier survival estimates for melanoma skin cancer patients at Saraburi Hospital (2008–2023).



Discussion

From this study on cutaneous malignant melanoma patients diagnosed at Saraburi Hospital between 2008 and 2023, it was found that the number of melanoma cases remained relatively stable, except during 2018–2020, when only 4 cases were reported. This decrease can likely be attributed to the COVID-19 pandemic in 2020, during which emergency declarations, social distancing measures, and telemedicine services were implemented to reduce unnecessary hospital visits. Some melanoma patients might not have been aware of the abnormality of their lesions or may not have considered them urgent enough to seek medical attention during this period. Similarly, other studies have reported a decline in new melanoma diagnoses during the pandemic.⁶⁻¹⁶

The median age of melanoma patients in this study remained relatively stable, but it was higher compared to data from previous study in Thailand and the Netherlands, where the median age was 58 and 50–59 years, respectively.^{5,6}

Regarding clinical presentations, there were no significant changes in common symptoms across the years. However, between 2021–2023, some patients presented with melanonychia (brown or black streaks on the nails), a symptom not observed in earlier years. This may reflect increased health awareness and access to information among patients. The lower extremities remained the most common location, which often overlooked by both patients and healthcare providers. The most common subtype was acral lentiginous melanoma, consistent with studies at Ramathibodi Hospital (2007-2012) and King Chulalongkorn Memorial Hospital (2015–2020).^{4,5}

This contrasts with studies in Europe and the United States, where the trunk is the most common location, and the most frequent subtype is superficial spreading melanoma.^{6,13,23} Between 2021–2023, there was an increase in melanoma cases in areas potentially linked to UV exposure, such as the head, neck, upper extremities, and trunk, similar to findings from studies in England.^{1,2,6,22}

The median time from symptom onset to diagnosis decreased from 12 months (2008–2013) to 3 months (2015–2020) but increased again to 12 months during 2021–2023, following the COVID-19 pandemic. Some patients may have noticed abnormal lesions but delayed seeking care until after the pandemic. Several studies have also shown delays in melanoma diagnosis due to the pandemic.^{8,9,11,18}

Pathologically, most patients had Breslow thickness greater than 4 mm. and Clarke level 4, which similar to previous study at Ramathibodi Hospital.⁵ There were no significant changes in Breslow thickness, Clarke level, or ulceration across the years, including the post-pandemic period. This aligns with a study in the Netherlands,⁶ which found no differences in Breslow thickness before and after the pandemic, unlike European studies reporting significant increases in Breslow thickness and ulceration post-pandemic.^{6-14,17} However, an increase in mitotic figures during 2021–2023 aligns with findings from Martinez-Lopez et al.¹⁷

Most common clinical stage was II, which similar to study by Ingkaninanda, et al.⁵ However, since 2018, there has been a rise in stage III cases, correlating with an increase in Sentinel Lymph Node Biopsy (SLNB) procedures. SLNB procedure rose from 46.2% (2015–2017) to 75% (2018–2020) and reached 100% during 2021–2023. This trend is consistent with a study by B. Leeneman et al., which also noted increased stage III cases alongside greater SLNB procedures likely due to changes in the National Comprehensive Cancer Network (NCCN) guidelines in 2012, recommending SLNB for melanoma stage IA with tumor thickness ≥ 0.75 mm, positive deep margins, lymphovascular invasion, or Clarke level IV.¹⁹

The proportion of metastasis to organs beyond the skin and lymph nodes was very low in this study, with only isolated cases of lung, brain, and bone metastases. This is consistent with findings from King Chulalongkorn Memorial Hospital and other studies, which reported the lungs as the most common metastatic site (18–36%), followed by the liver (14–20%), bones (11–17%), and gastrointestinal tract (1–7%).^{4,21}

Since 2015, there has been an increase in adjuvant therapy, including radiation, chemotherapy, and immune checkpoint inhibitors such as Pembrolizumab, Nivolumab (anti-PD-1), and Ipilimumab (anti-CTLA-4). 2 cases treated with immune checkpoint inhibitors were a stage IIC patient with recurrence in 2019 and a stage IIIC patient in 2021. Both responded well to treatment, with no disease progression and continued survival. However, the proportion of patients receiving immune checkpoint inhibitors remains low compared to King Chulalongkorn Memorial Hospital and international data.^{4,6} This highlights improving access to advanced therapies at Saraburi Hospital, although the availability of treatments such as Interferon and targeted therapies remains limited. Economic constraints and the high cost of therapies outside the National Drug List pose challenges to broader access.

The proportion of patients surviving within 5 years of diagnosis increased from 30.7% (2015–2020) to 75% (2021–2023). Although the follow-up period for the 2021–2023 cohort is incomplete, preliminary data suggest positive trends, consistent with international studies showing increased melanoma survival rates.^{6,22,24} The 5-year survival rate in this study was 10%, which aligns with the AJCC-8 international database for stage IV melanoma (10%). But it was lower compared to data from Ingkaninanda, et al (38.3%)⁵. For earlier stages, the AJCC-8 data reported survival rates of 99% for stage IA, 93% for stage IIIA, and 32% for stage IIID.² Additionally, there were clear reductions in recurrence, melanoma-related mortality, and loss to follow-up between 2008–2023. Of the 3 patients who died, all were stage IV cases. These improvements likely stem from increased public awareness of melanoma through educational campaigns and social media, encouraging timely medical visits and continuous follow-ups. The use of immune checkpoint inhibitors, which offer effective treatment with fewer side effects, has also contributed to better outcomes.

Conclusion

This study is the first retrospective research conducted on cutaneous malignant melanoma patients at a tertiary hospital over 15 years (2008–2023), encompassing the period of the COVID-19 pandemic. The findings reveal that most cutaneous malignant melanoma patients were elderly (over 65 years), the most frequent presentations were blackish lesions and ulcers. Lesions were most commonly found on the lower extremities and acral lentiginous melanoma was the common subtype. There was an increasing trend of stage III melanoma cases, attributed to the growing use of Sentinel Lymph Node Biopsy (SLNB). The proportion of patients surviving within 5 years of diagnosis has shown an upward trend, while the proportion of deaths from melanoma within 5 years has declined. The study reported a 5-year survival rate of 10% [0.10 (0.04–0.20)]. These findings highlight the importance of developing public education programs to raise awareness about melanoma symptoms. Moreover, public health policies should aim to increase access to advanced treatments, such as immune checkpoint inhibitors and targeted therapy, in the future. Efficient follow-up protocols should also be implemented to monitor and promptly treat patients with recurrent malignant melanoma.

References

1. Wiriyakulsit N, Klomkleang P, Sornda T, Kaewkong W. [Melanoma: incidence among the Thai population and the use of a molecular understanding of this cancer to improve the strategy of targeted therapy] [in Thai]. *Thai Cancer J.* 2021;41(3):134–50.
2. Zaba L, Wang J, Swetter S. Melanoma. In: Bolognia J, Schaffer JV, Cerroni L, editors. *Dermatology*. Philadelphia: Elsevier; 2024. p. 2009–44.
3. Matthews NH, Li WQ, Qureshi AA, Weinstock MA, Cho E. Cutaneous melanoma: etiology and therapy. In: Ward WH, Farma JM, editors. *Cutaneous melanoma*. Brisbane: [publisher unknown]; 2017. p. 3–22.
4. Anothaisatapon K, Meevassana J, Angspatt A. Cutaneous melanoma. In: Suankratat C, editor. *MDCU Congress 2021: Revolutions in global health; 8–10 Sep 2021; Chulalongkorn University, Bangkok*. Bangkok: [publisher unknown]; 2021. p. 489–521. [in Thai].

5. Ingkaninanda P, Visessiri Y, Rutnin S. Clinicopathological features and prognostic factors of malignant melanoma: a retrospective analysis of Thai patients in Ramathibodi Hospital. *J Med Assoc Thai.* 2015;98(8):820–7.
6. Leeneman B, Schreuder K, Uyl-de Groot CA, van Akkooi ACJ, Haanen JBag, Wakkee M, et al. Stage-specific trends in incidence and survival of cutaneous melanoma in the Netherlands (2003–2018): a nationwide population-based study. *Eur J Cancer.* 2021;154:111–9. doi:10.1016/j.ejca.2021.06.007.
7. Davis CH, Ho J, Greco SH, Koshenkov VP, Vidri RJ, Farma JM, et al. COVID-19 is affecting the presentation and treatment of melanoma patients in the northeastern United States. *Ann Surg Oncol.* 2022;29(3):1629–35. doi:10.1245/s10434-021-11086-8.
8. Ungureanu L, Apostu AP, Vesa-Stefan C, Caseriu AE, Frasila S, Iancu G, et al. Impact of the COVID-19 pandemic on melanoma diagnosis in Romania: data from two university centres. *Int J Environ Res Public Health.* 2022;19(22):15129. doi:10.3390/ijerph192215129.
9. Gil-Pallares P, Figueroa-Silva O, Gil-Pallares ME, Vazquez-Bueno JA, Pineyro-Molina F, Monteagudo B. Did COVID-19 lockdown delay actually worsen melanoma prognosis? *An Bras Dermatol.* 2023;98(2):176–80. doi:10.1016/j.abd.2022.08.004.
10. Sangers TE, Wakkee M, Kramer-Noels EC, Nijsten T, Louwman MWJ, Jaspars EH, et al. Limited impact of COVID-19-related diagnostic delay on cutaneous melanoma and squamous cell carcinoma tumour characteristics: a nationwide pathology registry analysis. *Br J Dermatol.* 2022;187(2):196–202. doi:10.1111/bjd.21050.
11. Ricci F, Fania L, Paradisi A, Di Lella G, Pallotta S, Sobrino L, et al. Delayed melanoma diagnosis in the COVID-19 era: increased Breslow thickness in primary melanomas seen after the COVID-19 lockdown. *J Eur Acad Dermatol Venereol.* 2020;34(12):e778–e79. doi:10.1111/jdv.16874.
12. Troesch A, Hoellwerth M, Forchhammer S, Del Regno L, Lodde G, Turko P, et al. The impact of the COVID-19 pandemic on the diagnosis of cutaneous melanomas: a retrospective cohort study from five European skin cancer reference centres. *J Eur Acad Dermatol Venereol.* 2023;37(5):922–31. doi:10.1111/jdv.18953.
13. Jeremic J, Sudecki B, Radenovic K, Mihaljevic J, Radosavljevic I, Jovanovic M, et al. Impact of the COVID-19 pandemic on melanoma diagnosis: increased Breslow thickness in primary melanomas – a single centre experience. *Int J Environ Res Public Health.* 2022;19(24):16806. doi:10.3390/ijerph192416806.
14. Lo Bello G, Pini GM, Ferguglia G, Regazzini R, Locatelli A, Patriarca C. Effects of COVID-19 restriction measures and clinical resetting on delayed melanoma diagnosis: a single-institution experience. *Ital J Dermatol Venereol.* 2021;156(4):497–8. doi:10.23736/S2784-8671.21.07052-3.
15. Toma AO, Prodan M, Reddyreddy AR, Seclaman E, Crainiceanu Z, Bloanca V, et al. The epidemiology of malignant melanoma during the first two years of the COVID-19 pandemic: a systematic review. *Int J Environ Res Public Health.* 2022;20(1):305. doi:10.3390/ijerph20010305.
16. Molinier R, Roger A, Genet B, Blom A, Longvert C, Chaplain L, et al. Impact of the French COVID-19 pandemic lockdown on newly diagnosed melanoma delay and severity. *J Eur Acad Dermatol Venereol.* 2022;36(3):e164–6. doi:10.1111/jdv.17802.

17. Martinez-Lopez A, Diaz-Calvillo P, Cuenca-Barrales C, Montero-Vilchez T, Sanchez-Diaz M, Buendia-Eisman A, et al. Impact of the COVID-19 pandemic on the diagnosis and prognosis of melanoma. *J Clin Med.* 2022;11(14):44181. doi:10.3390/jcm11144181.
18. Lallas A, Kyrgidis A, Manoli SM, Papageorgiou C, Lallas K, Sotiriou E, et al. Delayed skin cancer diagnosis in 2020 because of the COVID-19-related restrictions: data from an institutional registry. *J Am Acad Dermatol.* 2021;85(3):721–3. doi:10.1016/j.jaad.2021.05.021.
19. Weston GK, Jeong HS, Mu EW, Polsky D, Meehan SA. Impact of COVID-19 on melanoma diagnosis. *Melanoma Res.* 2021;31(3):280–1. doi:10.1097/CMR.0000000000000717.
20. Balch CM, Gershenwald JE, Soong SJ, Thompson JF, Atkins MB, Byrd DR, et al. Final version of 2009 AJCC melanoma staging and classification. *J Clin Oncol.* 2009;27(36):6199–206. doi:10.1200/JCO.2009.23.4799.
21. Balch CM, Soong SJ, Gershenwald JE, Thompson JF, Reintgen DS, Cascinelli N, et al. Prognostic factors analysis of 17,600 melanoma patients: validation of the American Joint Committee on Cancer melanoma staging system. *J Clin Oncol.* 2001;19(16):3622–34. doi:10.1200/JCO.2001.19.16.3622.
22. Memon A, Bannister P, Rogers I, Sundin J, AlAyadhy B, James PW, et al. Changing epidemiology and age-specific incidence of cutaneous malignant melanoma in England: an analysis of the national cancer registration data by age, gender and anatomical site, 1981–2018. *Lancet Reg Health Eur.* 2021;2:100024. doi:10.1016/j.lanepe.2021.100024.
23. Lashway SG, Harris RB, Farland LV, O'Rourke MK, Dennis LK. Age and cohort trends of malignant melanoma in the United States. *Cancers (Basel).* 2021;13(15):3866. doi:10.3390/cancers13153866.
24. Liszkay G, Kiss Z, Gyulai R, Olah J, Hollo P, Emri G, et al. Changing trends in melanoma incidence and decreasing melanoma mortality in Hungary between 2011 and 2019: a nationwide epidemiological study. *Front Oncol.* 2021;10:612459. doi:10.3389/fonc.2020.612459.