

Melanoma Diagnosis in the Post-COVID-19 Era: Return to “Normality” only in 2023 in 2 German Skin Tumour Centers

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Dear Editor,

Numerous reports concerning melanoma (MM) during the COVID-19 pandemic stated reduced numbers of new diagnoses and increased Breslow thickness during lockdown in different countries, e.g., the USA, France, and Italy (1–3). Moreover, the number of melanomas with less favourable prognostic parameters such as higher mitotic rate (≥ 2) and presence of ulcerations increased during the COVID-19 pandemic, as shown in large retrospective cohorts from Italy, Austria, Switzerland, and Germany (4). Our working group showed an increase in sentinel lymph node metastasis in both pandemic years 2020 and 2021 compared with 2019 in 2 German dermatological clinics as a possible result of a diagnostic delay (5). However, less is known about the development of the melanoma diagnosis in the post-COVID-19 era.

To investigate whether the clinical and pathological parameters of newly diagnosed melanomas in the post-pandemic years have returned to pre-pandemic levels, we conducted a data analysis of all melanoma cases diagnosed and surgically treated between 1 January 2022 and 31 December 2023 in 2 board-certified skin cancer centres in North Rhine-Westphalia (Wuppertal and Oberhausen) and compared it with the already reported data from the years 2019 (before the SARS-CoV-2 pandemic) and 2020/2021 (during the pandemic) (5). For all identified MM cases, the following parameters were analysed: patient's age, tumour thickness, pT-stage, presence of ulcerations, tumour stage according to the American Joint Committee on Cancer (AJCC), and detection of tumour infiltration in the sentinel lymph node (SLN), if applicable. The project was approved by the responsible ethics committee of University Witten/Herdecke (application number S-235/2021).

For statistical analysis IBM SPSS Statistics (version 29.0, IBM Corp, Armonk, NY, USA) was used. Descriptive statistics of metric scaled data were given by mean and standard deviation (SD). Group comparisons were performed using ANOVA and *t*-test to compare the groups with each other. The distribution of categorical data was presented by absolute and relative frequencies and compared between groups using a χ^2 test. All statistical hypothesis testing was two-tailed with a significance level of 0.05.

There was no reduction in the annual number of MM during the COVID-19 pandemic; moreover there was a substantial increase in MM diagnoses in 2022 and 2023, with the largest increase (of 31.5% compared with 2019) in 2022. Neither tumour thickness nor tumour stages (both pT stages and tumour stages according to AJCC 2017) showed a statistically significant difference between each other and compared separately with the data from 2019 (see **Table I**).

There was a statistically significant difference in the mean age of patients when using ANOVA. However, when the years were compared separately with the 2019 data using a *t*-test, there was only statistically significant higher patient age in 2022. Although there was similar proportion of young MM patients (≤ 40 years of age) compared with the year before the COVID-19 pandemic, it was a significantly higher proportion of older patients (> 70 years old) who presented with MM at the 2 participating clinics in 2022 ($p = 0.021$).

There was no statistical significance in the number of sentinel lymph node biopsies (SLNBs) performed in the years following the SARS-CoV-2 outbreak. However, the proportions of positive SLNBs were statistically significantly higher in 2020, 2021, and 2022 than in 2019 (**Fig. 1**). The year 2023 was the first year after the start of the COVID-19 pandemic in which the clinically distinct increase in positive SLNBs compared with 2019 (21 [17.5%] vs 10 [9.4%]) was no longer statistically significant.

So far, less is known about melanoma development in the years following the COVID-19 pandemic. A retrospective cohort from Romania revealed that also in the year 2022 and at the beginning of 2023 (second post-pandemic year defined as the period from 1 March 2022 to 28 February 2023), Breslow thickness and mitotic rate of newly diagnosed melanomas were still significantly higher compared with the pre-COVID-19 period (6).

The exact cause of this development is unclear. One explanation for our results could be that COVID-19 restrictions in Germany were waived only gradually. In February 2023 the requirement to wear a surgical mask on public transport was removed. In April 2023 all remaining restriction measures were terminated, officially marking the end of the pandemic. However, although

Table I. Clinical characteristics of patients, number and percentage of MM stages according to the American Joint Committee on Cancer (AJCC), tumour thickness (mm), presence of ulcerations in histological analysis of the tumours, and sentinel lymph node biopsies (SLNB) performed together with number and proportion of positively detected sentinel lymph nodes

Factor	Year					p-value
	2019	2020	2021	2022	2023	
Tumour thickness, mm, mean±SD	1.7±2.3	1.5±1.7	1.9 ± 3.4	1.5±2.1	1.5±2.0	0.182
Age, year, mean±SD	62.5±16.5	61.7±17.3	64.0 ± 15.8	66.5±16.0*	64.7±16.1	<0.001*
Number of newly diagnosed MM, n	320	319	347	421	379	
Age ≤40, n (%)	40 (12.5)	40 (12.6)	30 (8.6)	36 (8.6)*	30 (7.9)	0.044*
Age >40 / ≤70, n (%)	162 (50.6)	159 (49.8)	182 (52.5)	190 (45.1)*	200 (52.8)	
Age >70, n (%)	118 (36.9)	120 (37.6)	135 (38.9)	195 (46.3)*	149 (39.3)	
AJCC stage, n (%)						
0 (in situ)	55 (17.2)	41 (12.9)	54 (15.5)	83 (19.7)	80 (21.1)	0.51
I	185 (57.8)	196 (61.4)	206 (59.4)	241 (57.2)	213 (56.2)	
II	55 (17.2)	47 (14.7)	50 (14.4)	60 (14.3)	55 (14.5)	
III	19 (5.9)	29 (9.1)	26 (7.5)	36 (8.6)	28 (7.4)	
IV	6 (1.9)	6 (1.9)	11 (3.2)	1 (0.2)	3 (0.8)	
Tumour thickness, mm, n (%)						
≤1	147 (45.9)	156 (48.9)	163 (47.0)	200 (47.5)	169 (44.6)	0.742
>1–2	51 (15.9)	61 (19.1)	57 (16.4)	69 (16.4)	64 (16.9)	
>2–4	32 (10.0)	36 (11.3)	42 (12.1)	38 (9.0)	44 (11.6)	
>4	35 (10.9)	25 (7.8)	31 (9.0)	31 (7.4)	22 (5.8)	
pT stage, n (%)						
pT1	149 (46.6)	155 (48.6)	168 (48.4)	197 (46.8)	169 (44.6)	0.198
pT2	47 (14.7)	63 (19.7)	55 (15.9)	74 (17.6)	63 (16.6)	
pT3	34 (10.6)	34 (10.7)	40 (11.5)	39 (9.3)	45 (11.9)	
pT4	35 (10.9)	26 (8.1)	30 (8.7)	28 (6.6)	22 (5.8)	
Presence of ulcerations, n (%)	53 (16.6)	57 (17.9)	67 (19.3)	77 (18.3)	61 (16.1)	
Performed SLNB, n (%)	106 (33.1)	102 (32.0)	110 (31.7)	127 (30.2)	120 (31.7)	0.260
Positive SLNB, n (%)	10 (9.4†)	20 (19.6†)*	20 (18.2†)*	24 (18.9†)*	21 (17.5†)	

†Percentage of positive sentinel lymph nodes detected from the performed SLNB.

*Statistically significant increase compared with the year 2019 ($p < 0.5$).

the epidemiological situation was stable during 2022 and 2023 and appointments with healthcare professionals and scheduled surgical procedures were possible without any restrictions, our data indicate no return to “normality” before 2023. The increase in MM patients over 70 years of age in 2022 may be a possible indication that this patient group, which was at highest risk in the COVID-19 pandemic, were finally daring to visit dermatologists again. In 2023 the age ratio returned to pre-COVID values again.

A diagnostic and therapeutic delay in patients with melanoma significantly worsen their prognosis, as the median tumour doubling time was estimated to be 94 days (7). Also, an empiric rate of growth model for MM suggested that about one-third of the lesions with a Breslow thickness of ≤ 1 mm would achieve tumour thickness of over 1 mm (or pT2 stage) after a diagnostic delay of 3 months (8). It is therefore possible that the normalization of epidemiological MM development started with a delay only in 2023.

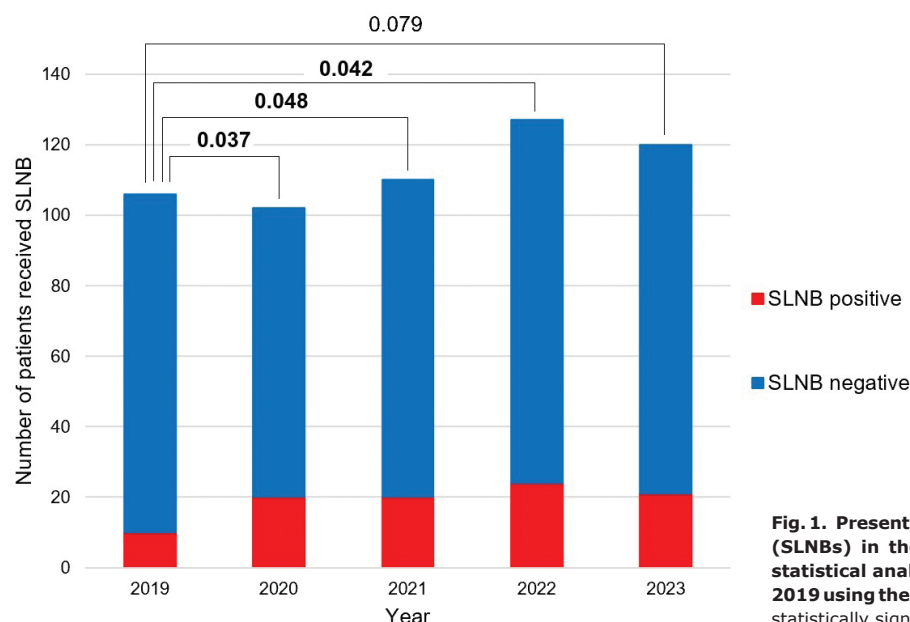


Fig. 1. Presentation of positive sentinel lymph node biopsies (SLNBs) in the years 2019 to 2023 with corresponding statistical analysis of the respective years compared with 2019 using the chi-square test. A p -value < 0.05 was considered statistically significant (here shown in bold).

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