

LETTER TO THE EDITOR

Long-term effects of the COVID-19 pandemic on malignant melanoma: increased lymph node metastases in two German dermatology clinics

Dear Editor,

Decreased numbers of new malignant melanoma (MM) cases,^{1–4} increased tumour thickness and occurrence of metastases of newly diagnosed melanomas^{5,6} in the time of the first SARS-CoV-2 wave compared to the same months in 2019 have been recently reported in some European countries and the USA. However, Sweden reported stable numbers of new detected melanomas with no significant effect of pandemic on tumour stages,⁷ possibly due to the absence of the lockdown.

To evaluate a long-time effect of the COVID-19 pandemic in Germany on detection and dermatosurgical treatment of MM, we analysed all melanoma cases diagnosed and surgically treated between 1 January 2019 and 31 December 2021 in two board-certified skin cancer centres in North Rhine-Westphalia, Helios University Hospital Wuppertal and Helios St. Elisabeth Hospital Oberhausen. For all identified MM cases, we analysed patients' age, tumour thickness, tumour stages according to the American Joint Committee on Cancer (AJCC), and detection of tumour cells in the sentinel lymph node (SLN), if applicable.

Statistical analysis was performed using IBM SPSS Statistics (version 22.0, IBM Corp., Armonk, NY, USA) and visualized using Microsoft Excel 2016 for Windows. Descriptive statistics of metric scaled data were given by median and interquartile range (IQR = 1st to 3rd quartile). Group comparisons were performed using ANOVA. The distribution of categorical data was presented by absolute and relative frequencies and compared

Table 1 Clinical characteristics of patients, number and percentage of the MM stages according to the American Joint Committee on Cancer (AJCC), tumour thickness (mm) and performed sentinel lymph node biopsies (SLNB) together with the number and proportion of positively detected sentinel lymph nodes

| | Year | | | P-value | |
|--|----------------------|----------------------|----------------------|--------------|-------|
| | 2019 Median (IQR) | 2020 Median (IQR) | 2021 Median (IQR) | | |
| Tumour thickness (mm) | 0.9 (0.4–2.1) | 0.9 (0.5–1.8) | 0.9 (0.4–1.9) | 0.178 | |
| Age (year) | 65 (51.2–75) | 63 (50–76) | 65 (55–77) | 0.174 | |
| | Year | | | P-value | |
| | 2019 n (%) | 2020 n (%) | 2021 n (%) | | |
| Total number of newly diagnosed MM | 320 | 319 | 347 | | |
| Number of surgically treated MM cases in inpatient setting | 338 | 298 | 326 | | |
| AJCC stage | 0 (<i>in situ</i>) | 55 (17.2) | 41 (12.9) | 54 (15.5) | 0.529 |
| | I | 185 (57.8) | 196 (61.4) | 206 (59.4) | |
| | II | 55 (17.2) | 47 (14.7) | 50 (14.4) | |
| | III | 19 (5.9) | 29 (9.1) | 26 (7.5) | |
| | IV | 6 (1.9%) | 6 (1.9) | 11 (3.2) | |
| Tumour thickness (mm) | ≤1 | 147 (45.9) | 156 (48.9) | 163 (47.0) | 0.639 |
| | >1–2 | 51 (15.9) | 61 (19.1) | 57 (16.4) | |
| | >2–4 | 32 (10.0) | 36 (11.3) | 42 (12.1) | |
| | >4 | 35 (10.9) | 25 (7.8) | 31 (9.0) | |
| Performed SLNB | 106 (33.1) | 102 (32.0) | 110 (31.7) | 0.591 | |
| Positive SLNB | 10 (9.4†) | 20 (19.6†)* | 20 (18.2†)* | 0.037 | |

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

*Statistically significant increase compared to the year 2019.

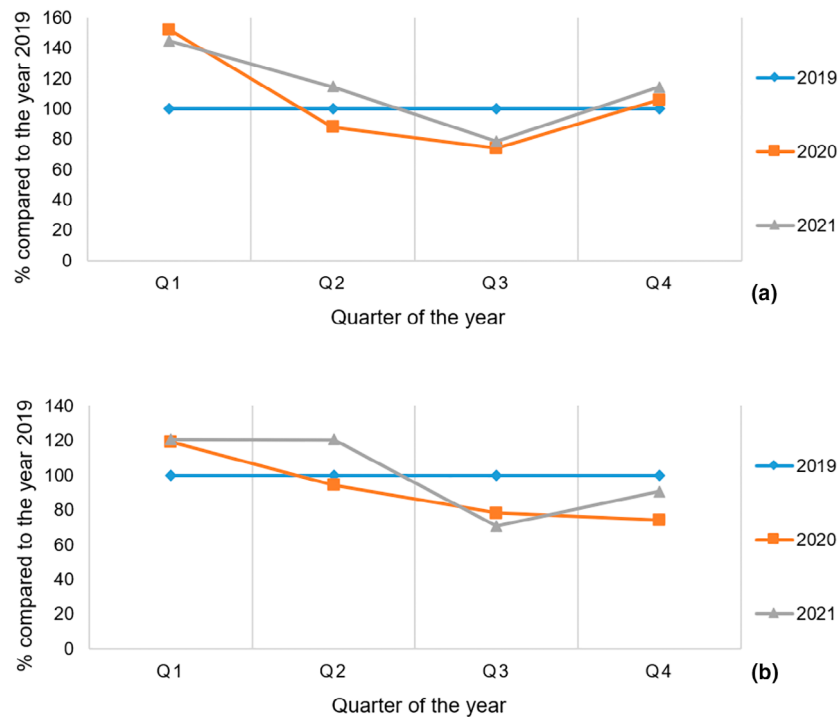


Figure 1 Changes in the proportion (%) of newly diagnosed (a) and treated in inpatient setting (b) malignant melanomas by quarters of the year of 2020 and 2021 compared to 2019 (assumed as 100%). The fluctuations go in line with the rising SARS-CoV-2 infection numbers in Germany (March and October 2020 as well as April and September 2021⁸).

between groups using Chi-squared test. All statistical hypothesis testing was two-tailed with a significance level of 0.05.

We identified 320 newly diagnosed MM cases in 2019, 319 in 2020 and 347 in 2021. Neither tumour thickness nor AJCC tumour stages or age of the patients in 2020 and 2021 showed statistically significant changes compared to pre-pandemic year ($P = 0.178, 0.529$ and 0.174 respectively) (Table 1).

Furthermore, 338 patients were admitted to the inpatient units for dermatosurgical treatment in 2019, compared to 298 in 2020 and 326 in 2021. The discrepancy between the newly diagnosed melanomas in 2019 ($n = 320$) and the number of the inpatient melanoma cases ($n = 338$) is attributed to the dermatosurgical treatment of MM cases diagnosed in December 2018.

There was no decrease of new MM cases in our data set comparing the pre-pandemic year to 2020 and 2021; however, we detected a fluctuation in absolute numbers and percentages analysing the four quarters of the year depending on the pandemic situation in Germany.⁸ Thus, the number of new MM cases started to decrease in the second quarter and reached the lowest point in the third quarter of both years, 2020 and 2021, rising again in the fourth quarter of these years (Fig. 1a). Also, less inpatient admissions for the dermatosurgical treatment of MM

were observed, starting to decrease in the second and third quarters of both years 2020 and 2021, but did not increase to the level of new diagnosed cases in the fourth quarters, indicating a shift of melanoma surgery to outpatient setting (Fig. 1b).

There were no statistically significant changes of the numbers of SLN biopsies performed during the last 3 years ($P = 0.591$); however, there were more positive SLNs detected in 2020 and 2021 compared to 2019 ($P = 0.037$). Although the rates of positive SLNs did not result in changes in AJCC tumour stages compared to the pre-pandemic year, the increased number of SLN metastases indicates some delay in melanoma diagnosing during the pandemic in Germany. Furthermore, the effect of this delay was not limited to the first year of the pandemic, but has been visible in 2021 as well. However, it is unclear, if this effect is due to the hesitancy of the patients to present to the dermatologists at the early stages of the disease or to the limited medical care offered under pandemic conditions.^{9,10}

To our knowledge, no comparable long-term data on the development of melanoma thickness in Germany during pandemic exist yet. Skin cancer screening needs to be suggested to all patients and performed regularly, as its reduction may result in increased numbers of late MM stages in the long-term perspective.

Acknowledgements

The authors would like to thank Beate Balkes (Medical Documentation of the Philipp Klee-Institute for Clinical Pharmacology, Helios University Hospital Wuppertal) and Steffen Goldbach (Medical Documentation of the Department of Dermatology, Venereology and Allergology, Helios St. Elisabeth Hospital Oberhausen) for providing the clinical information on tumour diagnosis and thickness.

Funding sources



In relation to this work, the authors declare that there are no funding sources.

Conflict of interest

In relation to this work, the authors declare that there are no conflicts of interest.

Data availability statement

Data available on request due to privacy/ethical restrictions.

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DOI: 10.1111/jdv.18337