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Assessment of Clinical Interruptions During the COVID-19 Pandemic on the Diagnosis of Melanoma: A 30-Month Retrospective Review

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1 **Assessment of Clinical Interruptions During the COVID-19 Pandemic on the Diagnosis of**
2 **Melanoma: A 30-Month Retrospective Review**

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24 During the COVID-19 pandemic, healthcare facilities reduced or suspended their clinical
25 services in an attempt to safeguard patients and providers from infection. These closures and
26 scaled-back clinical hours resulted in considerable diagnostic delays for many malignancies
27 typically detected by routine screening. Recent retrospective studies have demonstrated that
28 COVID-19 had significant impacts on the absolute detection of melanomas at major referral
29 centres.¹⁻³ While absolute decreases were observed in these studies, it is unknown if the
30 melanomas detected during COVID-19 represented proportionally more or less than would be
31 expected when corrected for a decrease in total collections. This retrospective review examined
32 all dermatopathology records at the Columbia University Department of Dermatopathology from
33 January 2019 to June 2021. Cases corresponding to malignant melanoma (MM) and melanoma
34 in situ (MiS) were identified in the pooled data set with Breslow depth recorded for each. Total
35 collections were used to determine the frequency of melanoma diagnosis each month (See
36 Figures 1 and 2). Statistical analysis was performed using a one-tailed Mann Whitney U Test
37 with an alpha of 0.05. The total collections for 2019, 2020, and the first half of 2021 were
38 128,596, 78,000, and 44,015, respectively. There was a 39% decrease in yearly collections from
39 2019 to 2020. In 2020, there was a respective 43.7% and 12.2% decrease in MM and MiS
40 diagnoses compared to 2019. From 2019 to 2020, diagnosis rates of MM did not significantly
41 change ($p=0.075$). However, MM were diagnosed with greater frequency in the first half of 2021
42 as compared to 2019 ($p=0.048$). Proportional detection rates of MiS increased in both 2020
43 ($p=0.041$) and 2021 ($p=0.045$) as compared to 2019. Excluding MiS, the median Breslow
44 thickness of MM for each year was 0.9mm ($p=1.0$). In line with other studies, we saw an
45 absolute decrease in both the number of MM and MiS detected between 2019 and 2020, with
46 43.7% fewer MM and 12.2% fewer MiS detected during this time. Notably, a proportional

47 increase in MM and MiS detection rate was observed in 2021, suggesting screening visits were
48 identifying an expected proportional elevation in the burden of disease. However, the substantial
49 absolute decrease in detection in 2020 points to a remaining burden of disease, which may be
50 uncovered with increased screening, possibly encouraged through state-wide or national health
51 campaigns. However, the impact of delay in diagnosis remains a matter of debate. While it is
52 tempting to assume an increase in undetected melanomas will correspond to an increase in
53 mortality, recent epidemiologic studies have suggested considerable melanoma over-diagnosis in
54 the US, with an increased incidence of lower stage disease reported without a corresponding
55 increase in mortality.^{4,5} Notably, median Breslow depth of invasive lesions did not substantially
56 change in our cohort. It is possible that primarily low-risk patients are being screened, who
57 present with lower stage disease. What seems clear based on this and related work is that a
58 considerable number of melanomas likely did go undetected due to the pandemic. Further
59 analysis, in broader cohorts, should be performed to ascertain the impact.

60 **Key words:** Melanoma, melanoma in situ, COVID-19, pandemic, skin cancer, screening

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70 data used in the study.

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108 Figure Legends:

109 Figure 1: The proportional incidence of MiS diagnoses from January 2019 to June 2021
110 adjusted for number of total collections.

111 Figure 2: The proportional incidence of MM diagnoses from January 2019 to June 2021
112 adjusted for number of total collections.

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