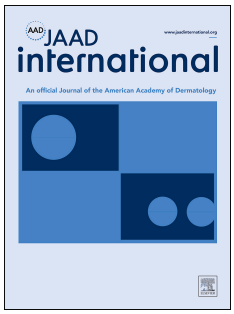
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.



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

Connor J. Stonesifer, B.A., Mine M. Yilmaz, M.D., George W. Niedt, M.D.

PII: S2666-3287(22)00096-7

DOI: https://doi.org/10.1016/j.jdin.2022.07.004

Reference: JDIN 241

To appear in: *JAAD International*

Received Date: 25 March 2022

Revised Date: 27 June 2022

Accepted Date: 13 July 2022

Please cite this article as: Stonesifer CJ, Yilmaz MM, Niedt GW, Assessment of Clinical Interruptions During the COVID-19 Pandemic on the Diagnosis of Melanoma: A 30-Month Retrospective Review, *JAAD International* (2022), doi: https://doi.org/10.1016/j.jdin.2022.07.004.

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

Connor J. Stonesifer[a], B.A., Mine M. Yilmaz[b], M.D., George W. Niedt[b,c*], M.D.

[a]*Columbia University Vagelos College of Physicians and Surgeons, New York City, USA;*
[b]*Columbia University Irving Medical Center, Department of Pathology, New York City, USA;*
[c]*Mount Sinai Hospital, Department of Dermatopathology, New York City, USA*

*Corresponding author:

George W. Niedt, M.D.
Co- Director
Dermatopathology
Mount Sinai School of Medicine
NY, NY, 10029
Tel: 212-241-6064
Fax:212-241-7832

Physical Address: 3rd FL Annenberg Bldg Rm 8, 1468 Madison Avenue, New York, NY 10029

Word Count: Manuscript: 499

Figures: 2

References: 5

The authors have not previously published this work or any section of this work.

The authors have no conflicts of interest related to the work.

The authors did not receive funding for the completion of this work.

Manuscript Text:

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

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

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

Acknowledgement Section:

The authors would like to acknowledge Ann M. McCormack for her assistance in accessing the data used in the study.

References:

1. Shannon AB, Sharon CE, Straker RJ 3rd, Miura JT, Ming ME, Chu EY, Karakousis GC. The impact of the COVID-19 pandemic on the presentation status of newly diagnosed melanoma: A single institution experience. J Am Acad Dermatol. 2021 Apr;84(4):1096-1098. doi: 33 10.1016/j.jaad.2020.12.034. Epub 2020 Dec 25.

2. McFeely O, Hollywood A, Stanciu M, O'Connell M, Paul L. Comment on "The Impact of the COVID-19 pandemic on the presentation status of newly diagnosed melanoma: a single institution experience". J Am Acad Dermatol. 2021 Aug 28:S0190-9622(21)02383-5. doi: 10.1016/j.jaad.2021.08.039. Epub ahead of print. PMID: 34464625; PMCID: PMC8403003.

3. Ricci F, Fania L, Paradisi A, et al. Delayed melanoma diagnosis in the COVID-19 era: increased 35 breslow thickness in primary melanomas seen after the COVID-19 lockdown. J Eur Acad Dermatol 36 Venereol. 2020; 34: e778- e779.

4. Welch HG, Mazer BL, Adamson AS. The Rapid Rise in Cutaneous Melanoma Diagnoses. N Engl J Med. 2021;384(1):72-79. doi:10.1056/NEJMsb2019760

5. Adamson AS, Suarez EA, Welch HG. Estimating Overdiagnosis of Melanoma Using Trends Among Black and White Patients in the US. JAMA Dermatol. Published online March 16, 2022. doi:10.1001/jamadermatol.2022.0139

Figure Legends:

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

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