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A retrospective analysis of the impact of the COVID-19 pandemic on staging at presentation of patients with invasive melanoma

To the Editor: We performed a single-institution retrospective analysis to evaluate the impact of the COVID-19 pandemic on staging at the presentation of patients with invasive melanoma at a large tertiary care center. A total of 246 patients were evaluated between March 11, 2020 (the declaration of the pandemic), and January 12, 2021, and 246 patients treated between March 1, 2019, and March 10, 2020, were then matched to form the prepandemic cohort. Categorical variables were compared using the 2-sided Fisher’s exact test. Continuous variables were compared using the 2-sided Wilcoxon rank sum test. The median progression-free survival and overall survival were estimated using the Kaplan-Meier method. P values were not adjusted for multiple comparisons because this was an exploratory study.

Patient characteristics are reported in Table I. In the postpandemic cohort, 200 (81.3%) patients presented with early-stage disease and 46 (18.7%) patients presented with metastatic disease, compared with 209 (85%) and 37 (15%) patients in the prepandemic cohort, respectively. In the postpandemic cohort, there was a significant decrease in the number of patients presenting with AJCC stage I disease (28.5% vs 40.7%, P = .006) and a significant increase in the number of patients presenting with stage III disease (30.5% vs 21.1%, P = .023). There was also an increase in the number of patients presenting with metastatic recurrence in the postpandemic cohort compared with the prepandemic cohort (7.7% vs 3.3%, P = .046). The median time to recurrence from the time of initial melanoma diagnosis was more than doubled in the postpandemic cohort (60.0 vs 25.5 months), although this did not reach statistical significance (P = .240). There was also a significant increase in the number of patients with brain metastases in the postpandemic cohort (6.5% vs 1.6%, P = .010) compared with the prepandemic cohort. An additional breakdown of the staging is presented in Table II.

Overall, there was a significant increase in the median Breslow depth (2.0 vs 1.4 mm, P = .047) and mitotic rate of >1/mm² (78.1% vs 66%, P = .008) in the postpandemic cohort. There were trends toward increased ulceration, lymphovascular invasion, perineural invasion, and microsatellite presence.

Table I. Patient characteristics

| Patient characteristics | Prepandemic patients (n = 246) | Postpandemic patients (n = 246) | P value |
|-------------------------|-------------------------------|-------------------------------|---------|
| Median age at diagnosis, y | 65 (IQR: 52-74, n = 246) | 65 (IQR: 54-73, n = 246) | .8467 |
| Sex | | | .5872 |
| Male | 130 (52.8%) | 137 (55.7%) | |
| Female | 116 (47.2%) | 109 (44.3%) | |
| Race | | | .0000 |
| White | 244 (99.2%) | 245 (99.6%) | |
| Black | 1 (0.4%) | 0 (0.0%) | |
| Other | 1 (0.4%) | 0 (0.0%) | |
| ECOG performance status at diagnosis | | | .0606 |
| 0 | 215 (87.4%) | 198 (80.8%) | |
| 1 | 25 (10.2%) | 41 (16.7%) | |
| 2 | 6 (2.4%) | 4 (1.6%) | |
| 3 | 0 (0.0%) | 2 (0.8%) | |
| Median time lesion present, mos | 1 (IQR: 0-5, n = 241) | 2 (IQR: 0-6, n = 225) | .3302 |
| Median time from initial diagnosis, mos | 13.5-78, n = 8 | 14-114, n = 25 | .2395 |
| Melanoma subtype | | | |
| Superficial spreading | 98 (49.7%) | 90 (43.7%) | |
| Nodular | 54 (27.4%) | 67 (32.5%) | |
| Lentigo maligna | 19 (9.6%) | 9 (4.4%) | |
| Acral | 0 | 2 (1.0%) | |
| Mucosal | 0 | 1 (0.5%) | |
| Other | 26 (13.2%) | 37 (18.0%) | |
| Unknown | 49 (19.9%) | 40 (16.2%) | |
| Presentation | | | .0929 |
| Limited stage de novo | 209 (85.0%) | 200 (81.3%) | |
| Metastatic de novo | 29 (11.8%) | 27 (11.0%) | |
| Metastatic recurrence | 8 (3.3%) | 19 (7.7%) | |
| Definitive surgical management | 210 (86.1%) | 203 (83.2%) | .4516 |
| Adjuvant therapy | | | .0335 |
| Immunotherapy | 153 (72.5%) | 121 (62.4%) | |
| Targeted therapy | 58 (27.5%) | 73 (37.6%) | |
| Systemic therapy | | | |
| Immunotherapy | 34 (89.5%) | 39 (88.6%) | |
| Targeted therapy | 4 (10.5%) | 5 (11.4%) | |

Bolded P values correspond to statistically significant differences between the pre- and post-pandemic cohorts.

ECOG, Eastern Cooperative Oncology Group; IQR, interquartile range.
Table II. Stage at diagnosis

| Stage | Prepandemic patients \((n = 246)\) | Postpandemic patients \((n = 246)\) | \(P\) value |
|-------|----------------------------------|----------------------------------|-------------|
| I     | 100 (40.7%)                      | 70 (28.5%)                       | .0059       |
| IA    | 45 (18.3%)                       | 32 (13.0%)                       | .1361       |
| IB    | 55 (22.4%)                       | 38 (15.5%)                       | .0650       |
| II    | 57 (23.2%)                       | 55 (22.4%)                       | .9144       |
| II A  | 23 (9.4%)                        | 21 (8.5%)                        | .8746       |
| II B  | 21 (8.5%)                        | 18 (7.3%)                        | .7390       |
| II C  | 13 (5.3%)                        | 16 (6.5%)                        | .7025       |
| III   | 52 (21.1%)                       | 75 (30.5%)                       | .0232       |
| III A | 13 (5.3%)                        | 17 (6.9%)                        | .5726       |
| III B | 18 (7.3%)                        | 25 (10.2%)                       | .3383       |
| III C | 20 (8.1%)                        | 30 (12.2%)                       | .1789       |
| III D | 1 (0.4%)                         | 3 (1.2%)                         | .6235       |
| IV    | 37 (15.0%)                       | 46 (18.7%)                       | .3355       |
| IV- M1a| 6 (2.4%)                        | 6 (2.4%)                        | >.99        |
| IV- M1b| 7 (2.8%)                        | 5 (2.0%)                        | .7716       |
| IV- M1c| 21 (8.5%)                       | 19 (7.7%)                       | .8692       |
| IV- M1d| 4 (1.6%)                        | 16 (6.5%)                       | .0102       |

Bolded \(P\)-values correspond to statistically significant differences between the pre- and post-pandemic cohorts.

A total of 179 (73.7%) patients in the postpandemic cohort and 175 (71.1%) patients in the prepandemic cohort underwent sentinel lymph node (SLN) biopsy at the time of wide local excision. During the pandemic, most patients who were eligible for SLN biopsy by pathologic criteria underwent SLN biopsy, with SLN biopsy foregone in 4 patients. Sixty-six (38.2%) SLN biopsies were positive for melanoma involvement in the postpandemic cohort, compared with 51 (29.7%) biopsies in the prepandemic cohort.

For patients who received adjuvant therapy (194 in the postpandemic cohort and 211 in the prepandemic cohort), those in the postpandemic cohort were more likely to receive oral targeted therapy (121 [62.4%] patients vs 58 [27.5%] patients) than immunotherapy (121 [62.4%] patients vs 153 [72.5%] patients, \(P = .034\)). There was no significant difference between the 2 groups in the type of systemic therapy administered in the metastatic setting. The median progression-free survival and overall survival were not reached in either group.

These findings suggest that patients had delays in coming to medical attention, likely resulting in more advanced disease. These data underscore the importance of early detection and oncology referral for patients with melanoma, even during the pandemic.

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Conflicts of interest

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