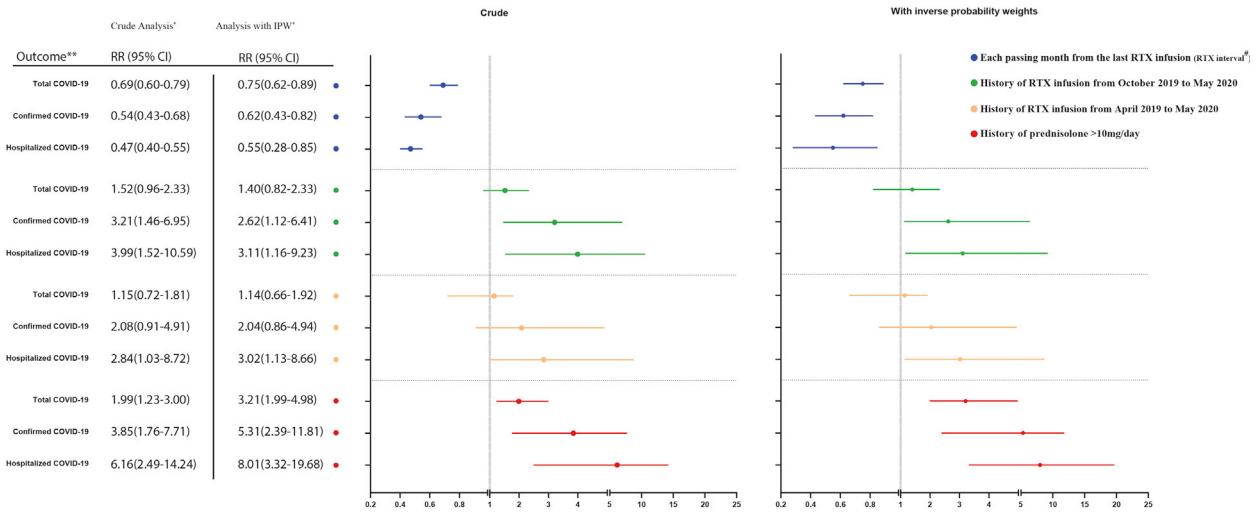


**Fig 1.** Univariate and multivariate analysis with IPW. Association between prednisolone and rituximab infusion with COVID-19 in patients with autoimmune bullous diseases. Asterisk indicates all 704 patients were included in the total COVID-19 analysis. For the diagnosed COVID-19 analysis, highly suspicious cases were excluded from the cohort. Likewise, both highly suspicious and nonhospitalized COVID-19 cases were excluded from the cohort in the hospitalized COVID-19 analysis. Double asterisk indicates outcomes: Total COVID-19 including diagnosed and highly suspicious cases; diagnosed COVID-19 cases; hospitalized COVID-19 cases. Hashtag indicates RTX interval was analyzed for patients who received RTX after April 2019 and was defined as the interval from the last dose of RTX to either the date of contracting COVID-19 or May 2020. The blue line shows the relative risk of outcomes with each passing month from the last RTX infusion with a 95% CI.

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*Funding sources: This research was supported by Tehran University of Medical Sciences and Health Services grant number 99-1-161-47611.*

*IRB approval status: IR.TUMS.VCR.REC.1399.189.*

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**Conflicts of interest**

None disclosed.

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https://doi.org/10.1016/j.jaad.2020.12.043

## The magnitude of COVID-19's effect on the timely management of melanoma and nonmelanoma skin cancers

*To the Editor:* The coronavirus disease 2019 (COVID-19) pandemic substantially reduced patient volumes or caused full closings of many US dermatology practices.[1,2] Given reduced access to care and National Comprehensive Cancer Network guidelines to defer surgical management,[3] concerns have been raised that patients with potential skin cancers had

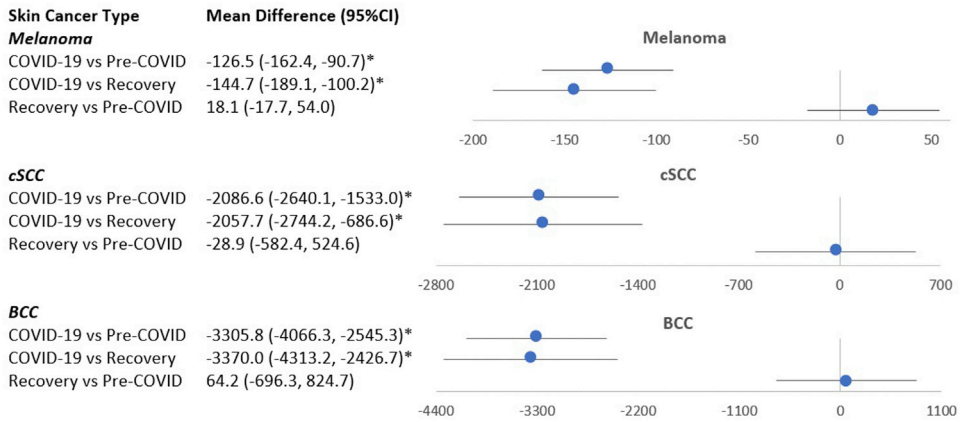


**Fig 1.** Mean difference in skin cancer diagnoses owing to COVID-19. Across the different types of skin cancers, there was a significant decrease in average number of diagnoses from the initial to peak COVID-19 pandemic (March to May 2020) compared with pre–COVID-19 (before March 2020) and the immediate COVID-19 recovery period (June to August 2020). *BCC*, Basal cell carcinoma; *CI*, confidence interval; *COVID-19*, coronavirus disease 2019; *cSCC*, cutaneous squamous cell carcinoma. *Analysis of variance with post hoc Tukey-Kramer, $P < .01$.

**Table I.** Percentage changes in skin cancers diagnosed by month in 2020 versus 2019

| | | Cutaneous melanoma | | | cSCC | | | BCC | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Period | Month | 2019, n = 2228 | 2020, n = 1944 | Change, no. (%) | 2019, n = 38,432 | 2020, n = 32,164 | Change, no. (%) | 2019, n = 51,991 | 2020, n = 42,958 | Change, no. (%) |
| Pre–COVID-19 | January | 292 | 262 | −30 (−1.0) | 5135 | 5047 | −88 (−1.7) | 6385 | 6824 | 439 (6.9) |
| | February | 298 | 323 | 25 (8.4) | 4790 | 4610 | −180 (−3.8) | 6164 | 6606 | 442 (7.2) |
| | Total | 590 | 585 | −5 (−0.9) | 9925 | 9657 | −268 (−2.7) | 12,549 | 13,430 | 881 (7.0) |
| Initial to peak COVID-19 | March | 293 | 240 | −53 (−18.1) | 4575 | 3073 | −1502 (−32.8) | 6103 | 4271 | −1832 (−30.0) |
| | April | 257 | 78 | −179 (−69.6) | 5069 | 1154 | −3915 (−77.7) | 6952 | 982 | −5970 (−85.9) |
| | May | 271 | 149 | −122 (−45.0) | 4959 | 3940 | −1019 (−20.5) | 6834 | 4456 | −2378 (−34.8) |
| | Total | 821 | 467 | −354 (−43.1) | 14,603 | 8167 | −6436 (−44.1) | 19,889 | 9709 | −10,180 (−51.2) |
| COVID-19 recovery | June | 276 | 301 | 25 (9.1) | 4442 | 5164 | 722 (16.3) | 6171 | 7163 | 992 (16.1) |
| | July | 289 | 339 | 50 (17.3) | 4685 | 4595 | −90 (−1.9) | 6584 | 6442 | −142 (−2.2) |
| | August | 261 | 261 | 0 | 4777 | 4581 | −196 (−4.1) | 6798 | 6214 | −584 (−8.6) |
| | Total | 817 | 892 | 75 (9.2) | 13,904 | 14,340 | 436 (3.1) | 19,553 | 19,819 | 266 (1.4) |
| | March–August | 1647 | 1368 | −279 (−16.9) | 28,507 | 22,507 | −6000 (−21.0) | 39,442 | 29,528 | −9914 (−25.1) |

*BCC*, Basal cell carcinoma; *COVID-19*, coronavirus disease 2019; *cSCC*, cutaneous squamous cell carcinoma.
Analysis of the data found a backlog of 279 cutaneous melanomas, 6000 cSCC, and 9914 BCCs that would have been expected to be diagnosed but have not yet been observed.

material delays in care. This study assessed the magnitude of delays in initial skin cancer diagnosis and management owing to COVID-19.

With institutional review board approval, data from January 2019 to August 2020 were analyzed from available outpatient-chart reviews of 143 US dermatology practices (350 providers) covering 4.7 million patients across 13 geographically distributed states. The number of diagnosed cutaneous melanomas, cutaneous squamous cell carcinomas (cSCCs), and basal cell carcinomas (BCCs) was determined. Data from 2020 were aggregated into pre–COVID-19 (January to February), initial to peak COVID-19 (March to May), and COVID-19 recovery (June to August). Analysis of variance with Tukey-Kramer testing was performed for multiple comparisons.

Average monthly number of skin cancers diagnosed significantly decreased during March to May 2020 compared with both before March 2020 (cutaneous melanoma mean difference −126.5, cSCC −2086.6, and BCC −3305.8) and the immediate recovery period (cutaneous melanoma −144.7, cSCC −2057.7, and BCC −3370.0) (Fig 1). Skin

cancers diagnosed in March to May 2020 were materially lower than from March to May 2019, with diagnoses decreased by 43.1% in cutaneous melanomas, 44.1% in cSCCs, and 51.2% in BCCs (Table I). The largest decreases were observed during April 2020 (cutaneous melanomas −69.6%, SCCs −77.7%, and BCCs −85.9%). As COVID-19's effect on dermatology practices decreased, the number of skin cancers diagnosed from June to August 2020 was only slightly higher than during June to August 2019 (cutaneous melanomas 9.2%, cSCCs 3.1%, and BCCs 1.4%). However, total 2020 skin cancer diagnoses continued to trail that of 2019, with 279 fewer cutaneous melanomas, 6000 fewer cutaneous SCCs, and 9914 fewer BCCs detected. Extrapolating these findings to the full US population (≈330 million), an estimated 19,600 cutaneous melanomas, 421,300 cSCCs, and 696,100 BCCs have had materially delayed initial diagnosis or treatment.

This study demonstrates COVID-19's ongoing effect on skin cancer diagnosis and management. Although skin cancer diagnoses have returned to the same-month 2019 baseline, our findings suggest that a large backlog of skin cancers remains undiagnosed. Assuming a best-case scenario wherein all delayed cancers were diagnosed at the first opportunity during the recovery period, there would still be an average diagnostic delay of 1.8 months for cutaneous melanomas, 2.1 months for cSCCs, and 1.9 months for BCCs. These delays in initial diagnosis and treatment may lead to skin cancers presenting at more advanced stages,[4] with potential increased morbidity and worse cutaneous melanomas survival outcomes.[5]

Limitations include data homogenization because US regions were temporally differentially affected by the COVID-19 pandemic. Sampling or ascertainment bias could affect these findings, but the patient base represented a large, diverse group (4.7 million persons). Given lacking socioeconomic data, results may not capture the pandemic's full magnitude and effect. Furthermore, although our findings suggest material delays existed in initial skin cancer diagnosis and management, further large-scale studies may be necessary to quantify the effect on health care costs, morbidity, and survival.

Our findings suggest that COVID-19 has materially delayed diagnosis and care for patients with skin cancer. Although the number of diagnoses returned to the approximate June to August 2019 baseline, a substantial backlog of undiagnosed cases still remains, with associated delay implications. Further studies may determine whether these delays will materially affect the stage at which subsequent skin cancers present and the potential associated increases in morbidity and mortality that may occur.

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*Funding sources: None.*

*IRB approval status: Approved by University of Central Florida IRB (approval 00000863).*

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**Conflicts of interest**

None disclosed.

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## The synchronized gene expression of retrotransposons and type I interferon in dermatomyositis

*To the Editor:* Dermatomyositis (DM) is an autoimmune, multiorgan disease. The type I interferon signature is characteristic in DM, and viral infection may be a contributing factor.[1] Retrotransposons are divided into 2 groups: non-long terminal repeat retrotransposons include long interspersed nuclear element-1 (LINE-1), Alu, and short interspersed nuclear elements (SINE)-variable number of tandem repeats (VNTR)-Alu (SVA), whereas long terminal repeat retrotransposons include endogenous retroviruses.[2] LINE-1 is a representative retrotransposon that regulates the expression of type I interferon through the MDA5 pathway.[3] The expression of

**Table I.** Clinical characteristics of DNA and RNA virus detection in patients with posttreatment dermatomyositis

| | | | | | DNA and RNA virus detection | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | After treatment | | Before treatment | |
| Patient | Age, y | Sex | Antibody | Therapy (per day) | Serum | Extracted RNA | Serum | Extracted RNA |
| 1 | 55 | F | ARS | PSL 10 mg, CyA 50 mg | ND | - | ND | ND |
| 2 | 55 | F | MDA5 | PSL 30 mg, Tac 3 mg, IVCY | ND | CMV | ND | ND |
| 3 | 41 | F | TIF1$\gamma$ | PSL 8 mg | - | - | ND | ND |
| 4 | 55 | F | Mi2 | PSL 40 mg | - | CMV | ND | ND |
| 5 | 51 | F | MDA5 | Unknown | - | - | ND | ND |
| 6 | 50 | M | MDA5 | PSL 10 mg, Aza 100 mg | - | - | ND | ND |
| 7 | 75 | F | negative | PSL 5 mg | - | - | ND | ND |
| 8 | 43 | M | negative | PSL 5 mg | - | - | ND | ND |
| 9 | 72 | F | negative | PSL 5 mg | - | EBV | ND | ND |
| 10 | 54 | F | negative | PSL 5 mg | - | - | ND | ND |
| 11 | 45 | F | negative | PSL 4 mg | - | - | ND | ND |
| 12 | 40 | F | ARS | PSL 10 mg | - | - | ND | ND |
| 13 | 66 | M | TIF1$\gamma$ | - | - | - | ND | ND |
| 14 | 52 | M | Mi2 | PSL 3 mg | - | - | ND | ND |
| 15 | 76 | F | TIF1$\gamma$ | PSL 5 mg | - | - | ND | ND |
| 16 | 46 | F | ARS | PSL 5 mg | - | - | ND | ND |
| 17 | 68 | F | TIF1$\gamma$ | PSL 6 mg | - | - | ND | ND |
| 18 | 68 | F | negative | PSL 1 mg | - | - | ND | ND |
| 19 | 63 | F | negative | PSL 1 mg | - | HHV7 | ND | ND |
| 20 | 38 | M | negative | PSL 4 mg | - | - | ND | ND |
| 21 | 51 | M | TIF1$\gamma$ | PSL 5 mg | - | - | ND | ND |
| 22 | 53 | M | Mi2 | PSL 6 mg | - | - | ND | ND |
| 23 | 63 | F | negative | PSL 5 mg | - | - | ND | ND |
| 24 | 60 | F | negative | PSL 4 mg | - | - | ND | ND |
| 25 | 43 | M | negative | PSL 5 mg | - | - | ND | ND |
| 26 | 59 | F | MDA5 | Unknown | - | CMV, EBV | ND | ND |
| 27 | 54 | F | MDA5 | Unknown | - | - | ND | ND |
| 28 | 52 | F | MDA5 | Unknown | ND | EBV | ND | ND |
| 29 | 58 | M | negative | - | ND | ND | - | - |
| 30 | 60 | M | unknown | - | ND | ND | - | - |
| 31 | 71 | M | unknown | - | ND | ND | - | - |
| 32 | 44 | F | MDA5 | - | ND | ND | - | ND |
| 33 | 10 | F | MDA5 | - | ND | ND | - | ND |
| 34 | 45 | M | MDA5 | - | ND | ND | - | ND |
| 35 | 57 | F | MDA5 | - | ND | ND | - | ND |

The detected viruses were rhino/enterovirus, enterovirus 68, parechovirus, coronavirus, HSV, CMV, parvovirus B19, VZV, HHV6, HHV7, HHV8, and EBV.

*Aza,* Azathioprine; *CMV,* cytomegalovirus; *CyA,* cyclosporine A; *EBV,* Epstein-Barr virus; *F,* female; *HHV,* human herpesvirus; *HSV,* herpes simplex virus; *IVCY,* intravenous cyclophosphamide; *M,* male; *ND,* not described; *PSL,* prednisolone; *Tac,* tacrolimus; *VZV,* varicella zoster virus; -, negative.