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## Male balding is a major risk factor for severe COVID-19



*To the Editor:* Recent observations by Wambier et al<sup>1</sup> suggest that men with pattern baldness are at high risk for severe symptomatic COVID-19 infection. Two preliminary studies<sup>1,2</sup> noted high rates of androgenic alopecia in men hospitalized for severe COVID-19. Both of these uncontrolled observational studies were limited by small sample size. To further evaluate this intriguing observation, we examined severity of hair loss in 1941 hospitalized male patients tested for COVID-19 using data from the UK Biobank. We conducted multivariable logistic regression analysis, where the outcome was a positive COVID-19 test result, and the main variable of interest was severity of balding. Other variables accounted for were age, body mass index (BMI), hypertension, dyslipidemia, and diabetes.

From 2006 to 2010, the UK Biobank recruited approximately 500,000 individuals from the United Kingdom and collected detailed information about their medical history. Informed consent was obtained from all participants registered with the UK Biobank. Data were regularly updated, and the most recent data from 2019 were used for all covariates analyzed in our study. During the original intake, 226,938 men chose from 1 of 4 options that best characterized their hair loss using images adapted from the Hamilton-Norwood scale.<sup>3</sup> Options included the following text: pattern 1, no hair loss; pattern 2, slight hair loss; pattern 3, moderate hair loss; and pattern 4, severe hair loss.<sup>4</sup> COVID-19 testing was carried out on symptomatic patients per National Health Service guidelines.<sup>5</sup>

Descriptive frequencies for COVID-19 results, balding patterns, age, and BMI are reported in Table I. The cohort included 1605 patients who tested negative for COVID-19 and 336 patients who tested positive. Mean age and BMI were similar between the 2 groups. As shown in Table I, COVID-19 positivity trended higher with increasing baldness. Of the 592 patients reporting pattern 1, 15.03% tested positive. Of the 404 patients reporting pattern 2, 16.83% tested positive. Of the 551 patients reporting pattern 3, 18.15% tested positive. Of the 394 patients reporting pattern 4, 20.05% tested positive.

Odds ratios and corresponding confidence intervals for balding patterns are shown in Table II. When compared to pattern 1, patients who reported pattern 4 were significantly more likely to test positive for COVID-19 in the hospital (adjusted odds ratio, 1.408; 95% confidence interval,

**Table I.** Descriptive frequencies for COVID-19 testing results, balding patterns, age, and BMI

Variable	COVID-19 (–) test result	COVID-19 (+) test result
Total, n	1605	336
Pattern 1, n (%)	503 (84.97)	89 (15.03)
Pattern 2, n (%)	336 (83.17)	68 (16.83)
Pattern 3, n (%)	451 (81.85)	100 (18.15)
Pattern 4, n (%)	315 (79.95)	79 (20.05)
Age, y, mean	59.13	59.03
BMI, kg/m <sup>2</sup> , mean	28.67	29.11

BMI, Body mass index.

**Table II.** Odds ratios and confidence intervals for balding patterns and covariates from a multivariable logistic regression analysis where the outcome is a positive COVID-19 test result\*

Effect	Odds Ratio (95% CI)	P value
Pattern 2 vs 1	1.144 (0.808-1.613)	.4454
Pattern 3 vs 1	1.271 (0.928-1.744)	.1362
Pattern 4 vs 1	1.408 (1.004-1.972)	.0468
Age	0.995 (0.979-1.011)	.5179
BMI	1.014 (0.987-1.041)	.3062
Hypertension vs no hypertension	0.941 (0.714-1.246)	.6679
Dyslipidemia vs no dyslipidemia	1.240 (0.960-1.602)	.0993
Diabetes vs no diabetes	1.041 (0.721-1.482)	.8273

BMI, Body mass index; CI, confidence interval.

\*All statistical analyses were performed with SAS 9.4 (SAS Institute, Cary NC).

1.004-1.972;  $P = .0468$ ). Neither patterns 2 nor 3 reached significance from pattern 1 in rates of positive COVID-19 test results. None of the covariates were associated with a positive COVID-19 test result.

Our study compared a large sample of hospitalized COVID-19–positive patients to a control group of hospitalized COVID-19–negative patients and thus builds on and supports the observations of Wambier et al.<sup>1</sup> A notable limitation of our work is that balding data were self-reported. Although the exact mechanism remains unknown, severe androgenic alopecia seems to be associated with hospitalization for COVID-19. The large effect of baldness on the risk of COVID-19 suggests that the presence of severe baldness may help clinicians and public health authorities identify and protect those at greatest risk.

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