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.

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Variability in counselling for adrenal insufficiency in COVID-19 and beyond: a survey of rheumatology practice

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The COVID-19 pandemic has presented challenges and uncertainty for patients and physicians. Corticosteroids are the most commonly prescribed pharmacotherapy in rheumatology. Long-term corticosteroids are prescribed for many rheumatic diseases, including rheumatoid arthritis, giant cell arteritis, and polymyalgia rheumatica.[1] Diabetes, hypertension, and weight gain (all poor prognostic factors for COVID-19) are widely recognised adverse events associated with long-term corticosteroid use; however, the high prevalence of glucocorticoid-induced adrenal suppression (eg, in 20 [48%] of 42 patients with rheumatoid arthritis receiving prednisolone at ≥5 mg/day for at least 6 months[2]) is less well known.

Patients with adrenal insufficiency should be informed regarding corticosteroid sick day rules, including the risk of life-threatening adrenal crisis if corticosteroids are discontinued suddenly, or if there is insufficient stress dosing.[3] Prompt supplementary corticosteroids are required in the context of significant intercurrent infection, including COVID-19, major trauma, or surgery; and intravenous corticosteroids are needed if vomiting.[3] Despite the importance for patient safety, guidelines regarding corticosteroid sick day rules for rheumatology patients are unclear and, consequently, there is variation in practice. Most clinicians double the corticosteroid dose, but this crude rule-of-thumb can lead to undertreatment or overtreatment. Clear information for patients is particularly important during the current COVID-19 pandemic due to restricted or modified access to usual levels of health care—eg, delayed or virtual conversion of clinic appointments and difficulty accessing helplines. In September, 2020, WHO recommended corticosteroids to reduce mortality in critically ill COVID-19 patients.[4] However, worse outcomes were suggested in patients with COVID-19 not requiring supplemental oxygen. Significantly poorer outcomes were reported in patients receiving at least 10 mg/day prednisolone (n=64)[5] for rheumatic disease, but to the best of our knowledge, there has been no evidence of adverse outcomes attributed to supplemental stress doses of corticosteroids in COVID-19.

Here we report the results of a survey evaluating corticosteroid sick day rule counselling, and highlight an educational need to prevent adrenal crisis. In March, 2020, the British Society for Rheumatology (BSR) issued shielding guidance for patients receiving long-term (>4 weeks) corticosteroids, either as high-dose monotherapy (>20 mg/day) or low-dose (≥5 mg/day) prednisolone combined with another immunosuppressant.[6] The shielding guidance identified categories of patients as clinically vulnerable, who were advised to take extra precautions during the first peak of the pandemic in England. Some clinicians and patients elected to delay starting or increasing corticosteroids for inflammatory flares, due to perceived safety concerns and to avoid needing to shield. Anecdotally, we became aware of safety incidents (adrenal crises) after discontinuation of long-term corticosteroids or inadequate dose increments with concomitant COVID-19 (unpublished). In April, 2020, the BSR updated their advice to reflect endocrinology consensus guidelines on prevention of adrenal crisis for COVID-19.[7] These guidelines stated that hospitalised patients on long-term corticosteroids with COVID-19 should receive intravenous corticosteroids; in the community, patients taking 5 mg to 20 mg prednisolone daily should take 10 mg prednisolone twice daily and patients taking more than 20 mg should continue their usual dose, but in divided doses.[7] The twice-daily prednisolone dose (to mimic the stress response[7]), is an unfamiliar frequency of administration in rheumatology practice. We conducted an online survey, via the BSR (electronic newsletter and social media), between May 16, and

July 16, 2020, to assess corticosteroid sick day rule counselling and to improve visibility of the COVID-19-specific corticosteroid guidelines.

We aimed for a sample size of 100 respondents, which was selected as a reasonable compromise between generalisability of the results and feasibility. Although the survey was done during the peak of the first wave of the COVID-19 pandemic, there was rapid engagement, with the target of 100 responses achieved within a short period of time. Respondent characteristics reflected the BSR professional body, as the majority of respondents were consultants.

Of 100 respondents (93 physicians and seven specialist nurses), only 50% always or usually counselled patients about corticosteroid sick day rules, and 28% did this rarely or never. The timing and content of education was variable (results in appendix). The majority counselled patients when starting (45%) and tapering (42%) corticosteroids, and advised not to discontinue corticosteroids suddenly (85%) and to increase doses with intercurrent infection (72%). Although 74% prescribed a variable regimen, 15% advised patients to self-titrate without contacting a medical professional. Despite recognising that infection might warrant increased corticosteroid doses, 69% of clinicians changed their usual management with COVID-19 (52% would reduce the corticosteroid dose, 10% would not increase, and 7% would advise a lower than usual increment), 10% would give the same advice (as per any other infection), and only 13% followed the recent endocrinology guidance. The majority (74%) would refer someone with suspected adrenal insufficiency for endocrinology consultation without doing any investigations themselves; the remaining showed variability in timing and testing for adrenal insufficiency. After being directed to the endocrinology COVID-19-specific guidelines,[7] 71% changed their management and 16% stated that they had not read the guidance.

To our knowledge, this is the first evaluation of corticosteroid sick day rules in rheumatology, which are highly relevant, given that many patients with rheumatic disease receive long-term prednisolone. Patients receiving long-term prednisolone are more vulnerable to infection and might have poorer outcomes with COVID-19;[5] however, approximately half might have adrenal insufficiency and are at risk of adrenal crisis with significant intercurrent infection, as highlighted by the UK National Patient Safety Alert.[8] Patients with primary adrenal insufficiency on replacement corticosteroids exhibit greater knowledge of sick day rules than patients receiving corticosteroids for non-endocrine immunosuppressive indications, and therefore rheumatology patients might be at higher risk of adrenal crisis.[9]

Our results show variation in practice. Despite acknowledging that intercurrent infection might necessitate corticosteroid dose increment, most clinicians said they would reduce the dose with COVID-19. This highlights a significant unmet educational need among rheumatologists. This unmet need is an immediate and critical patient safety issue, given a global second wave of COVID-19 and the advent of seasonal influenza. We also call for specific guidance and clinician training to better manage patients taking long-term corticosteroids, to standardise sick day rule counselling across specialties, including issuing the steroid emergency card[7] and patient information leaflets.[10] Consideration should be given to the type and severity of stressors (eg, infection, surgery, and trauma). Guidelines published in May, 2020,[11] recommend perioperative stress-dosing, despite limited evidence. Supplemental steroid dosing during times of physiological stress is considered the safest approach. Guidance is also needed for the evaluation of adrenal insufficiency in patients taking long-term prednisolone.

See **Online** for appendix

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