



Ramesh, A. V., Pufulete, M., Reeves, B. C., & Gibbison, B. (2020). Peri-operative corticosteroid supplementation for patients on therapeutic glucocorticoids: a national survey. *Anaesthesia*. Advance online publication. <https://doi.org/10.1111/anae.15176>

Peer reviewed version

Link to published version (if available):
[10.1111/anae.15176](https://doi.org/10.1111/anae.15176)

[Link to publication record in Explore Bristol Research](#)
PDF-document

This is the author accepted manuscript (AAM). The final published version (version of record) is available online via Wiley at <https://onlinelibrary.wiley.com/doi/full/10.1111/anae.15176> . Please refer to any applicable terms of use of the publisher.

University of Bristol - Explore Bristol Research

General rights

This document is made available in accordance with publisher policies. Please cite only the published version using the reference above. Full terms of use are available: <http://www.bristol.ac.uk/red/research-policy/pure/user-guides/ebr-terms/>

Perioperative corticosteroid supplementation for patients on therapeutic glucocorticoids: A national survey

Aravind V Ramesh¹, Maria Pufulete², Barnaby C Reeves³, Simon Fletcher⁴, Jeremy W Tomlinson⁵ and Ben Gibbison⁶

Authors

1. NIHR Academic Clinical Fellow, Bristol Royal Infirmary, Bristol, UK, @vincrit
2. Senior Research Fellow, Bristol Trials Centre (Bristol Royal Infirmary Hub), University of Bristol, Bristol, UK, @MariaPufulete
3. Professor and Co-director, Bristol Trials Centre (Bristol Royal Infirmary Hub), University of Bristol, Bristol, UK
4. Consultant in Anaesthesia and Intensive Care, Norfolk and Norwich University Hospitals NHS Trust, Norwich, UK
5. Professor of Metabolic Endocrinology, Oxford Centre for Diabetes, Endocrinology and Metabolism, Churchill Hospital, University of Oxford, Oxford, UK
6. Consultant Senior Lecturer in Anaesthesia and Intensive Care, University of Bristol, Bristol, UK, @bengibbison

Correspondence to:

Dr Ben Gibbison
Department of Anaesthesia and Intensive Care
Level 7
Bristol Royal Infirmary
Marlborough St
Bristol
BS2 8HW
UK

Email: ben.gibbison@bristol.ac.uk

Dear Prof. Klein

Corticosteroid use is common with 8.4 million UK prescriptions for oral preparations in 2018[1].

They are prescribed as replacement for deficiency as well as therapeutically for a range of conditions. There is **no question** that those on *replacement* corticosteroids (e.g. for pituitary / adrenal disease) need additional peri-operative dosing, but there are uncertainties as to which patients on *therapeutic* corticosteroids (e.g. for COPD, inflammatory arthritides) should receive

supplementation, as well as the optimal dose. Up to one-third of patients on *therapeutic* corticosteroids show evidence of adrenal suppression when well[2]; in theory these patients could be unable to increase endogenous production to cover surgical stress. No robust *evidence-based* guidelines exist currently – recently published national consensus guidance is based on little class A and B evidence[3].

We hypothesised that UK clinical practice was likely to be extremely variable prior to publication of the guidance and this insight would help optimise future study designs to address the most important uncertainties. We conducted an electronic survey (SurveyMonkey ©) of the perioperative prescribing practices of 18,203 Royal College of Anaesthetists (RCoA) Fellows / Members to those taking therapeutic corticosteroids. Formal Ethics Committee approval was not required as this did not fulfil current definitions of research.

The survey was open between 23rd September and 23rd October 2019. 1415/18,203 (8%) fully / partially completed questionnaires were received. Most respondents were Consultant Anaesthetists (1012/1415; 71.5%) from 13 NHS regions. Table 1 shows the initial approach to prescribing. More detailed prescribing practices can be found in the supplementary material[4]. The majority (1266/1329; 95%) prescribed perioperative steroid and most (675/1226; 55%) used 10mg prednisolone daily as their prescribing threshold. Few stated they would prescribe additional steroid to those on topical (37/1226; 3%) or inhaled (68/1226; 6%) steroids. Most did not test pre-operatively for adrenal suppression (1141/1226; 93%). 41% of respondents (499/1226) used moderate surgery (e.g. laparoscopic cholecystectomy) as the threshold for additional supplementation. The majority (1046/1079; 97%) chose to give an induction steroid dose; 100mg

hydrocortisone was the most common dose (472/1079; 44%). Importantly, there was no consensus on dosing, frequency or post-operative duration.

This is the first national survey characterising perioperative corticosteroid prescribing practice for patients on therapeutic corticosteroids. The survey suggests that both patient and procedural factors guided prescribing decisions, but with substantial practice variation. The absence of consensus prior to guideline publication is a reflection of the lack of high-quality evidence.

The strength of our survey is the high proportion of Consultant Anaesthetist replies from all over the UK – making it likely to be a good snapshot of UK practice. The main limitation is the low absolute response rate - in part due to the means of dissemination. There are around 8,000 Consultant Anaesthetists currently practising in the UK and therefore the true response rate of Consultants is likely to be higher than the absolute rate appears. RCoA mailing lists hold addresses for current and retired anaesthetists as well as a number no longer practising / practising abroad. The individuals who responded were also more likely to have an interest in peri-operative care and corticosteroids and therefore there may be some degree of reporting bias.

Very few UK anaesthetists were prescribing corticosteroids in a similar regimen to that which was contained in the subsequent guidance [3]. They appeared to have a higher threshold (daily corticosteroid dose) and prescribed lower supplementary doses. This variation before guideline publication can be explained in part by the lack of high-quality evidence to guide clinical decision making and time will be needed for the new guidance to embed before establishing if it has reduced practice variation. The survey provides a basis on which high-quality RCTs that test different therapeutic regimens can be designed.

References

1. NHS Digital. *Prescription Cost Analysis - England 2018*. Available from: <https://digital.nhs.uk/data-and-information/publications/statistical/prescription-cost-analysis/2018>. Accessed 1st June 2020
2. Woods CP, Argese N, Chapman M et al. Adrenal suppression in patients taking inhaled glucocorticoids is highly prevalent and management can be guided by morning cortisol. *European Journal of Endocrinology* 2015; 173: 633–42.
3. Woodcock T, Barker P, Daniel S et al. Guidelines for the management of glucocorticoids during the peri-operative period for patients with adrenal insufficiency. *Anaesthesia* 2020; 75: 654-663.
4. Gibbison, B et al., Corticosteroid prescribing practices for subsequent dosing. Available from: https://figshare.com/articles/Corticosteroid_prescribing_practices_for_subsequent_dosing/124031

	Number of respondents	Percentage (%)
Threshold therapeutic steroid dose for prescribing additional perioperative steroid (1226/1415 responses – rate 87%)		
5mg prednisolone or higher	329	26.8
10mg prednisolone or higher	675	55.1
20mg prednisolone or higher	103	8.4
Other	119	9.7
Which route of therapeutic steroid would make you prescribe additional steroid? (1226/1415 responses – rate 87%)		
Oral	977	79.7
Topical	37	3
Inhaled	68	5.6
Intravenous	1077	87.9
Intramuscular	583	47.6
None of the above	5	0.4
What duration of therapeutic steroid would make you prescribe additional steroid? (1226/1415 responses – rate 87%)		
Any length of time (even one dose)	82	6.7
One week or more	258	21
One month or more	482	39.3
Three months or more	288	23.5
Six months or more	47	3.8
Twelve months or more	6	0.5
Other (not specified)	63	5.1
What test do you perform to assess adrenal suppression? (1226/1415 responses – rate 87%)		
No test	1141	93.1
Random or 9am cortisol	8	0.7
Short Synacthen test	31	2.5
Short synacthen test and a serum cortisol	29	2.4
Other	17	1.4
What type of surgery would make you prescribe additional steroid? (1226/1415 responses – rate 87%)		
Any procedure (local and general anaesthesia)	61	5
Any procedure under general anaesthesia	284	23.2
Minor (e.g. hernia), moderate (e.g. Lap cholecystectomy) and major (e.g. CABG, joint replacement)	248	20.2
Moderate (e.g. Lap cholecystectomy) and major (e.g. CABG, joint replacement)	499	40.7
Major surgery (e.g. CABG, joint replacement) only	134	10.9
What induction dose of steroid do you give? (1079/1415 responses – rate 76%)		
Don't give one	33	3.1
25mg hydrocortisone	316	29.3
75mg hydrocortisone	23	2.1
100mg hydrocortisone	472	43.7
Other dose or different drug	235	21.8

Table 1: General approach to perioperative steroid management

Acknowledgments

None to declare.

Competing Interests

Authors SW and JWT were involved in the writing of the AAGBI, SfE, RCoA consensus guidelines for the peri-operative use of steroids. BG and BR are supported by the NIHR Biomedical Research Centre at University Hospitals Bristol and Weston NHS Foundation Trust and the University of Bristol. The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.