Re-audit of bedside glucose monitoring of inpatients on glucocorticoids: have we improved?

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Exogenous glucocorticoids are commonly prescribed medication used across a large variety of medical and surgical specialities for their excellent anti-inflammatory properties. However, the advantages to using glucocorticoids must be balanced against their many well described adverse effects.[1] In particular, excessive glucocorticoid use contributes to whole-body insulin resistance that can result in hyperglycaemia in those known to have diabetes, or the development of steroid-induced diabetes, which may or may not be transient.[2]

In 2014, colleagues at our institution audited glucocorticoid use and adherence to recommended glucose monitoring guidance.[3] At that time 12.8% (n=120) of the inpatient population were on glucocorticoids with only 20.8% of those (n=25) having their glucose monitored. Of those 25 people, 13 had pre-existing diabetes. Since then, national guidelines on the management of hyperglycaemia and glucocorticoid therapy have been published.[4] These guidelines recommended glucose monitoring regimens for those taking glucocorticoids. They stated that those who were known to have diabetes should have their glucose tested four times a day. Those without a diagnosis of diabetes should have either pre-lunch or pre-evening meal testing. If they develop a capillary glucose above 12.0 mmol/L, then testing should be four times a day.

We re-audited glucose monitoring in those adult inpatients on glucocorticoids at our institution on a single day in January 2020. We had 945 adult beds occupied on the day of the cross-sectional audit. Those with and without diabetes over 18 years old on glucocorticoids were identified using our patient administration system, electronic pathology system and electronic prescribing and medicines administration system (JAC®, WellSky Ltd, Basildon, Essex, UK). We excluded those on the children's ward, maternity wards or in the emergency department.

Table 1 shows the results, and compares them with the data from 2014. We found that 8.9% (n=84) of inpatients were receiving exogenous steroids. Of these, 48% (n=40) were having their glucose monitored. 87.5% (n=14) of those with diabetes were having four times a day testing. However, only 37% (n=25) of those with no previous diagnosis of diabetes were having the advised once daily glucose monitoring. We did not analyse which of these individuals should have been having four times a day testing, nor did we set out to identify any individuals with newly diagnosed diabetes or steroid-induced diabetes in those who were not known to have diabetes prior to admission.

Table 1 Results of re-audit of inpatient glucose monitoring of patients on steroids

		2014		2020	
		n	%	n	%
Female		68	57	45	54
Male		52	43	39	46
Diabetes	Yes	16	13	16	19
	No	104	87	68	81
Steroid	Dexamethasone	16	13	17	14
	Hydrocortisone	4	3	6	7
	Methylprednisolone			6	7
	Prednisolone	99	83	55	72
Indication	Respiratory	76	63	24	29
	MSK/Rheum	21	18	18	21
	Oncology	12	10	8	10
	Other/unknown	11	9	34	30
Duration	<10 days	56	47	29	24
	>10 days	64	53	55	76
Monitoring	Yes	25	21	40	48
	No	95	79	44	52

MSK/Rheum = musculoskeletal/rheumatology.

This re-audit has shown some improvement in glucose monitoring of those taking steroids as an inpatient. However, it is still less than half of the target population and not in line with the Joint British Diabetes Societies for Inpatient Care (JBDS-IP) guidance published in 2014. It is possible that the improvement in monitoring since our last audit is due to an increased awareness among medical and nursing staff of the impact of glucocorticoids on glucose concentrations and the potential consequences. However, this is just speculation.

This re-audit was undertaken because our institution had recently introduced electronic prescribing. The electronic platform allows alerts to be added when high-risk medications are used. Despite the poor performance in glucose monitoring shown by our previous audit, our pharmacy would not add an alert reminding those who were dispensing the glucocorticoids (ie, trained ward nurses) to conduct bedside capillary glucose monitoring unless we

could show that it was not being carried out already in accordance with the JBDS-IP guidance adopted by our hospital. Despite the improvement in monitoring frequency, it remains suboptimal and, as a result of the current work, our pharmacy has agreed to introduce the alert once the pandemic has resolved. We aim to re-audit the impact of this in due course.

Conflict of interest Professor Dhatariya is one of the lead authors on the JBDS guideline entitled 'Management of hyperglycaemia and steroid (glucocorticoid) therapy: a guideline from the Joint British Diabetes Societies (JBDS) for Inpatient Care group'.
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Fixed-dose combination: beware of its limitations

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We read with great interest the editorial detailing the likelihood of cardiovascular (CV) benefit from the triple fixed-dose combination (FDC) therapy for patients with type 2 diabetes mellitus.[1] Sodium-glucose cotransporter-2 inhibitors (SGLT2i) are preferred in view of their documented CV benefits. The FDC pill containing metformin, dipeptidyl peptidase-4 (DPP-4) inhibitor and SGLT2i has been approved by the US FDA. However, the CV protective effects of SGLT2i may be less when combined with metformin. For instance, with canagliflozin, the risk of CV death and hospitalisation was reduced by 36% in metformin non-users versus 12% in metformin users (p=0.03).[2] Although this may well be a type 1 statistical error, notably, a similar trend was also observed with empagliflozin (53% vs 32%, p=0.01).[3] A possible explanation may be that the use of metformin has its well-documented CV benefits; thus, additional benefits were minimised with the added use of SGLT2i.[4] Interestingly, the addition of a DPP-4 inhibitor to metformin resulted in improved CV outcomes compared with the initiation of DPP-4 inhibitor in non-metformin users.[5] Therefore, the issue deserves further investigation, perhaps as an endpoint in a future CV outcome trial with an SGLT2i.

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