

How Frequently Are Bedside Glucose Levels Measured in Hospital Inpatients on Glucocorticoid Treatment?

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Background: Glucocorticoids are widely used in many medical specialities for their anti-inflammatory and immunosuppressive qualities. The majority of glucocorticoid use is in the outpatient setting. Long term glucocorticoid use is associated with several side effects, including the development of hyperglycaemia. Observational data for many – if not most – medical and surgical conditions requiring hospitalisation suggests that the additional presence of hyperglycaemia or diabetes is associated with poorer outcomes^{1,2}. Despite this association, there are no data on the prevalence of glucocorticoid use in hospitalised inpatients. We conducted a single centre prevalence study carried out over two consecutive days in January 2014, assessing every adult bed (n=940) in our institution, excluding the Accident & Emergency Department, Coronary Care, and Intensive Care Units looking at the numbers of patients on glucocorticoids and to see how many had their glucose levels measured.

Results: We found that 120 patients (12.8%) were on glucocorticoids. The data are shown in the table.

99 patients (82.5%) were on prednisolone. The mean daily dose (MDD) for prednisolone was 25.0mg ± 12.5 (range: 0.5 – 60). 16 patients (13.3%) were receiving dexamethasone, with a MDD of 9.2mg ± 6.5 (range: 0.5 - 20). The remaining four patients (3.3%) were receiving hydrocortisone, either intravenously or orally, with a MDD of 107.5mg ± 106.9 (range: 20 – 200). 64 (53.3%) of patients had received their glucocorticoid treatment for longer than 10 days at the time this data was collected.

Of the 120 patients receiving glucocorticoids, only 25 (20.8%) had their blood glucose levels measured during their time as inpatients. Of these, 13 had pre-existing diabetes. There were 3 patients who had diabetes and were receiving glucocorticoids, but had no regular blood glucose measurements. Compared to those without diabetes, patients with pre-existing diabetes were more likely to have their glucose levels measured ($p < 0.001$). Of the patients without diabetes, only 12 patients (11.5%) were having blood sugars measured whilst on glucocorticoids.

Variable	Category	N (%)
Age (years)		74.7 ± 14.3
Gender (M:F)		52 (43.3):68 (56.7)
Previous diagnosis of diabetes (Y:N)		16 (13.3): 104 (86.7)
Steroid type	Prednisolone	99 (82.5)
	Dexamethasone	16 (13.3)
	Hydrocortisone	4 (3.3)
Indication for steroids	Respiratory	76 (63.3)
	Musculoskeletal	14 (11.7)
	Vasculitis	7 (5.8)
	Oncology	12 (10.0)
	Other	11 (9.2)
Duration of course	>10 days	64 (53.3)
	< 10 days	56 (46.7)
Glucose monitoring	No monitoring	95 (79.2)
	Glucose levels monitored	25 (20.8)

Discussion: Despite the widespread knowledge that glucocorticoid use is associated with the development of hyperglycaemia and that hyperglycaemia is associated with poor outcomes, we have found that glucose monitoring in people on glucocorticoids is poor. This may be for several reasons, including a lack of appreciation amongst senior and junior doctors of the importance of managing inpatient hyperglycaemia or ‘therapeutic inertia’.

Treatment options include the use of sulphonylureas or insulin.

Conclusion: In an attempt to raise awareness of this condition, and algorithms on how to manage it, a new guideline produced by the Joint British Diabetes Societies Inpatient Care group addresses glucocorticoid associated hyperglycaemia and is freely available at www.diabetologists-abcd.org.uk/JBDS/JBDS.htm.

In line with the glucose targets for hospitalised patient in other guidelines, the JBDS recommend that it should be 6-10mmol/L with a range of 4-12mmol/L being acceptable.

1. Baker EH, Janaway CH, Philips BJ et al. Hyperglycaemia is associated with poor outcomes in patients admitted to hospital with acute exacerbations of chronic obstructive pulmonary disease. *Thorax* 2006;61:284-289. 2. Kwon S, Thompson R, Dellinger P et al. Importance of perioperative glycemic control in general surgery: A report from the surgical care and outcomes assessment program. *Ann Surg* 2013;257:8-14.