

# The monitoring and incidence of hyperglycaemia in inflammatory bowel disease patients treated with intravenous steroids

**Authors:** Benjamin Zare, Richard Harris, Suranga Dharmasiri, Martin McDonnell, Tilly Steane, Louise Downey, Fraser Cummings, Markus Gwiggner and Benjamin Mitchell

## Aims

To improve detection and establish the frequency of steroid-induced hyperglycaemia among inpatients with a flare of inflammatory bowel disease (IBD) receiving intravenous hydrocortisone by improving capillary blood glucose (CBG) monitoring in line with locally adapted Joint British Diabetes Societies (JBDS) guidelines.

## Methods

Consecutive patients admitted to University Hospital Southampton (UHS) over a 3-month period between 1 February 2017 and 30 April 2017 with an IBD flare and treated with intravenous hydrocortisone were identified electronically by the hospital coding department and electronic prescribing records. Hospital notes were then retrospectively reviewed to document frequency and timing of CBG monitoring.

Electronic recording of CBG levels across UHS was implemented on 1 July 2017 with each blood glucose monitor maintaining a wireless connection to the trust's electronic results server, updating in real time. A second phase of retrospective data collection was carried out from 1 July 2017 to 1 October 2017 to determine whether electronic recording improved adherence.

On 2 October 2017 we introduced an electronic prompt to check CBG which appeared in our electronic prescribing system for IBD patients receiving steroids. The frequency of CBG monitoring was then recorded prospectively between 15 October 2017 and 15 January 2018.

## Results

In the first cohort CBG was recorded in 66.7% (n=9) on admission. However following initiation of steroids, only 11.1% had post-prandial CBG level recorded on days one and two with no subsequent recordings.

Following electronic CBG monitoring 62.5% (n=16) of patients had baseline CBG level recorded. The mean frequency of monitoring on days one to four was 28.1%.

**Table 1. Table showing number of patients receiving a minimum of one post-prandial CBG measurement per day compared with before and after introduction of electronic recording of CBG measurements**

CBG recorded	First audit (n=9)	Second audit (n=16)	Third audit (n=21)
On admission	6 (67%)	10 (63%)	21 (100%)
On day 1 of steroid therapy	1 (11%)	1 (6%)	19 (90%)
On day 2 of steroid therapy	1 (11%)	6 (38%)	20 (95%)
On day 3 of steroid therapy	0 (0%)	5 (31%)	19 (90%)
On day 4 of steroid therapy	0 (0%)	6 (38%)	15 (71%)

CBG = capillary blood glucose.

After introduction of electronic prompting, post-prandial CBG level was recorded in 90–95% (n=21) of patients on days one to three and 71.4% on day four. In this cohort 67.7% of participants had recorded CBG levels >11 mmol/L and 46.2% had a CBG >12 mmol/L.

## Conclusion

JBDS guidelines recommend that CBG should be checked 4 hours after starting intravenous hydrocortisone, post-prandial and at least once-daily following this with treatment started after two readings >12 mmol/L.

Through improved monitoring we are detecting and treating more patients with steroid induced diabetes. In our final cohort 67.7% of patients met criteria for steroid-induced hyperglycaemia in the first 4 days of hydrocortisone treatment. These patients had an average age of 45.6 and body mass index of 22.4 and so may not have been previously thought to be at risk. Identification and treatment of hyperglycaemia are clearly important to avoid associated complications. ■

## Conflict of interest statement

The authors have no conflicts of interest to declare.

**Authors:** Gastroenterology, University Hospital Southampton NHS Foundation Trust, Southampton, UK