MedNut Mail

The How, When, Where, Which and Why of pharmacotnutrition

Prednisolone, diabetes drugs and BSLs

Y Coleman

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https://medicationsandnutrition.online

Commentary

Commonly the pre-breakfast BSLs may be the only routine monitoring strategy for those with long term diabetes and deemed relatively stable and further daily monitoring is rarely considered. Therefore, people with diabetes and who are also prescribed prednisolone may be experiencing regular afternoon hyperglycaemia and no-one is aware.

Prednisolone has a time to peak of 4-6 hours, and a duration of 12-16 hours, therefore administration in the morning causes afternoon and evening hyperglycaemia, but not overnight hyperglycaemia.

For those prescribed prednisolone, hyperglycaemia management strategies should therefore be designed to target the timeframe from midday to midnight. Further, their BSLs should be checked sometime during the afternoon and/or evening – not in the morning before breakfast.

There is often a reluctance by care staff to prick fingers anymore often than necessary, therefore I generally suggest a 3-day-only trial; 3 days should provide sufficient evidence to identify whether there are any prednisolone-induced afternoon hyperglycaemia patterns. I usually consider a choice of BSL testing times such as:

- the timeframe of 2 hours after the midday meal (typically midday in residential care facilities) and before afternoon tea, and/or

- before the evening meal (5pm in residential care facilities), and/or
- 2 hours after supper -as supper is typically 7pm in residential care facilities, advisable to consider about 9pm.

Complicating the steroid-induced hyperglycaemia is the hypoglycaemic effect of the prescribed diabetes management drugs and their durations, and examples include:

- saxagliptin, sitagliptin, vidagliptin, glargine, detemir have durations of more than 24 hours,
- metformin XR, gliclazide ER, glimiperide, linagliptin, rosiglitazone, posiglitazone, mixtard, isophane have durations of about 24 hours,
- metformin has a duration of about 12 hours,
- others have shorter durations of various periods.

Typically, many of the diabetes management drugs are administered before breakfast, and so afternoons and evenings are the times when many

of the longer-duration drugs are at their maximally effective period.

Ascertaining glycaemic status becomes quite important when drugs with opposing glycaemic effects are maximally effective at the same time. If a person has high afternoon glycaemia then one should ask why, especially in the presence of prednisolone and diabetes drugs, and there seem to be 3 options, being:

- the person's grazing is sufficient to offset the hypoglycaemic effect of the diabetes drugs (least likely);
- the prednisolone's hyperglycaemic effect is greater than the hypoglycaemic effect of the diabetes management drugs;
- the person is overmedicated with the diabetes management drugs resulting in hyperglcaemia ie the hyperglycaemia is due to the dual effects of prednisolone and overmedication with diabetes drugs.

It is not unusual for people to be observed grazing "on naughty foods" in the afternoons and are consequently labelled "non-compliant" – and yet these are otherwise-responsible adults who know what they "should and should not be eating" and are otherwise concerned about their health. So why do these people graze in the afternoons? And do they require 24-hour glycaemic control coverage if they are typically sleeping 8 of those hours? So are they being "naughty" by wilfully grazing or are their bodies trying to counteract the combined hypoglycaemic effect of several prescribed drugs ie the grazing response is actually iatrogenically-induced.

When a staff member informs you that an individual is "non-compliant" with their diabetes management do you accept the statement at face value or do you look a bit more closely at the prescribed medicines impacts on glycaemia and the adequacy of their BSL monitoring?

Case study

Medical History with Nutritional Aspect

Amputation	☐	Constipation	☑	Dysphagia	☐	MND	☐
Anaemia	☐	CVA	☐	Enteral Feed	☐	MS	☐
Arthritis	☐	CVD	☐	Falls	☐	Osteoporosis	☐
Cancer	☐	Dementia	☑	Fracture	☐	PD	☐
CCF	☐	Dentures	☐	Frailty	☐	Pressure Area	☐
Chest Infection	☐	Depression	☑	Gout	☐	Renal	☐
COAD	☐	DM Type 1	☐	Hypertension	☑	Ulcer	☐
Confusion	☐	DM Type 2	☐	Incontinent	☐	UTI	☐

Food Allergies: psoriasis

Other: Down's Syndrome, hypercholesterolaemia

Biochemistry with Pharmaconutritional Consequences

Na:	142	mmol/l	Hb:	141	g/L	Albumin:	29	g/L	BSL:		mmol/l
K:	4.0	mmol/l	Lymph:	2.0		Total Protein:	68	g/L	HbA1C:		
Urea:	5.2	mmol/l	MCV:	107	mmol/l	B12:		pmol/L	INR:		
Creatinine:	0.062	mmol/l	Zn:		umol/l	Folate:		nmol/L	TSH:		mIU/L

Other: eGFR > 60, CRP 13.0, ESR 21

Medications That May Adversely Affect Nutritional Status

Drug	Vits + Mins	bpp >90%	N/V	C/D	Wt	App	Tst	Thir	Sal	Drlg	d m	Dys	BSL
AXIT 30		☐	N	D	↑	↑	☐				☑	☐	☐
Donepezil		☑	NV	CD	↓	↓	☐				☑	☐	☐
Pantoprazole	(20 mg/day) B1, B12, Ca, Fe,	☑	NV	CD		↓	☑				☑	☐	☐
Paracetamol		☐	NV	CD			☐				☐	☐	☐
		▩					▩				▩	▩	▩

Comments – medication and nutrition impacts (direct and indirect) only

Recent relevant available biochemistry results indicate elevated MCV therefore advisable to check B12 levels. There is disagreement between pathology ranges and research findings with regard to appropriate B12 levels. Neuro-imaging research found a direct causal link between B12 status, damage to the brain, and consequent memory impairment; it also found increasing memory impairment as B12 levels dropped even whilst within currently defined acceptable ranges and that B12 interventions are effective once levels are less than 300 pmol/L.

Regular monitoring sodium levels recommended whilst axit prescribed.

Pantoprazole decreases B12, vitamin C, magnesium, zinc and iron absorption, may decrease calcium absorption, and decreases thiamine availability.

Dietary levels of caffeine intake in conjunction with paracetamol inhibit antinocieception.

Since Mr AAF has ongoing infections as a consequence of his very poor dentition and is also prescribed pantoprazole, therefore advisable to check zinc status. Zinc is important in immune system function, and typically when immunity is low so is zinc status. If Mr AAF has low zinc status then advisable to review necessity for pantoprazole whilst zinc intervention administered as pantoprazole decreases zinc absorption.

What else would you include?

Medications have profoundly and positively changed health outcomes however they do generally come with some nutritional harms. By identifying and addressing the nutritional harms, optimal health outcomes are closer to being achieved.

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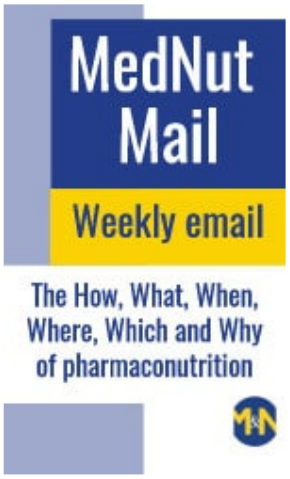

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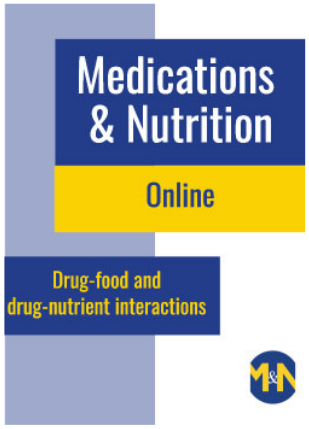

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