Sodium-Glucose Cotransporter-2 Inhibitors and Perioperative Diabetes: Management in Elective Surgery

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RESEARCH WEEK
5-9 OCTOBER 2020
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Background

- Sodium-glucose cotransporter-2 inhibitors (SGLT2i) are the newest class of oral antihyperglycaemics approved to treat diabetes mellitus (DM).[1]

- SGLT2i are a **perioperative management issue.**
- This is due to their rare but critical risk of **diabetic ketoacidosis (DKA)**.[2]
- SGLT2i-associated DKA may be precipitated by fasting, dehydration and surgical stress.[1]

- There is increased DKA risk if SGLT2i are not ceased in a timely manner before surgery.[1]
- However, there is also risk of poor glycaemic control with perioperative changes to diabetic medications.[3]

Aims & Objectives

To determine if SGLT2i cessation prior to elective surgery is associated with **(i)** increased incidence of perioperative hyperglycaemia compared to patients treated with other antihyperglycaemics and **(ii)** reduced incidence of ketosis (marker of SGLT2i-associated DKA).

Method

- This prospective, observational study included all adult patients with DM undergoing elective surgery at Northern Health over 7 weeks (n = 146).
- Patient details, perioperative diabetes management & surgical outcomes collected on day of surgery.

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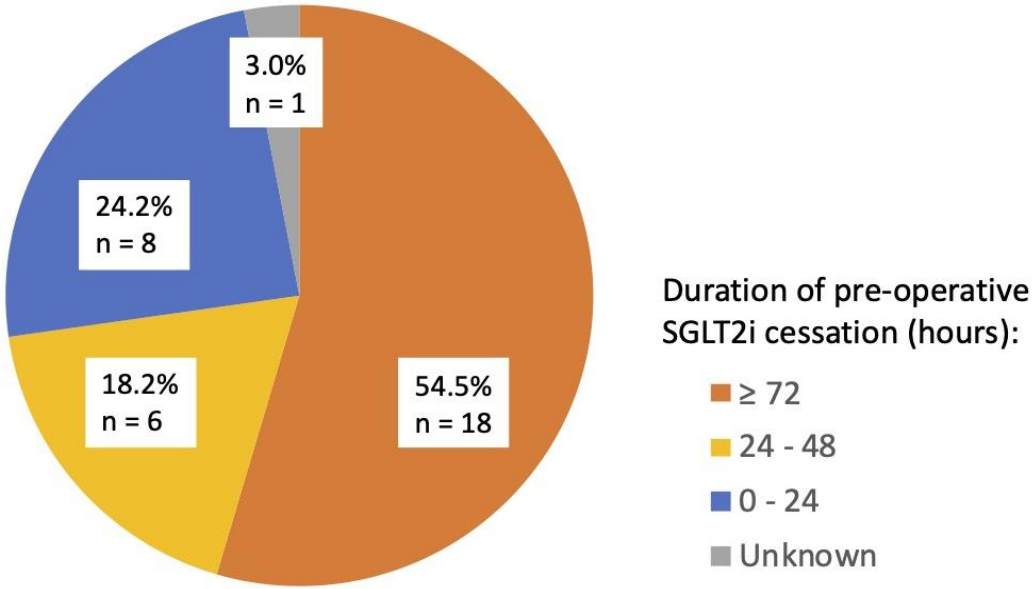
Results and Discussion

Demographics:

- 22.6% (33/146) on SGLT2i
- 77.4% (113/146) on ≥ 1 non-SGLT2i antihyperglycaemic

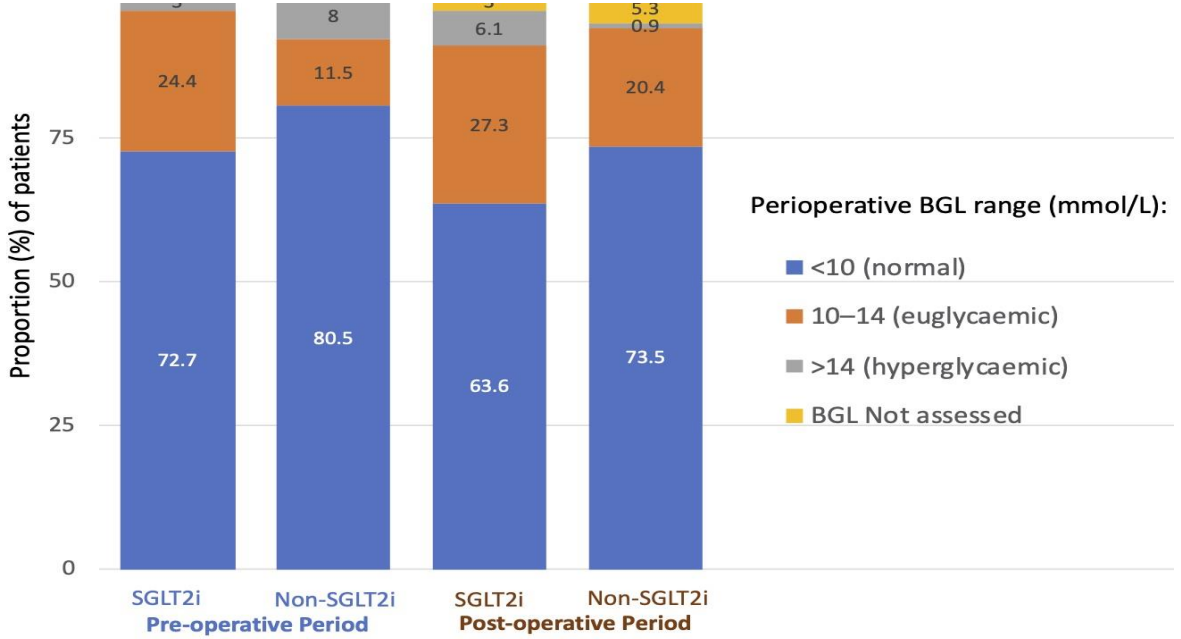
Pre-operative SGLT2i cessation to manage DKA risk:

Figure 1. Proportion (%) of elective surgical patients on SGLT2i and pre-op SGLT2i cessation timeframes



Perioperative hyperglycaemia (BGL >14mmol/L) incidence:

Figure 2. Incidence of perioperative hyperglycaemia in SGLT2i-treated vs. non-SGLT2i elective surgical patients.



No difference in hyperglycaemia incidence between patients on SGLT2i compared to non-SGLT2i pre-op (p = 0.16) and post-op (p = 0.21).

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Results and Discussion

Incidence of elevated capillary ketones (marker of DKA):

Table 1. Pre-operative SGLT2i cessation timeframes and perioperative capillary ketone levels, n (%)

	Duration of pre-operative SGLT2i cessation (hours prior to elective surgery procedure)				
Perioperative capillary ketone range (mmol/L)	≥ 72 n = 18	24 – 48 n = 6	0 – 24 n = 8	Unknown n = 1	P - value
Pre-operative period					**0.11**
Not assessed	4 (22.2)	2 (33.3)	0 (0.0)	1 (100.0)	
< 0.6	14 (77.8)	4 (66.7)	7 (87.5)	0 (0.0)	
0.6 – 1.0	0 (0.0)	0 (0.0)	1 (12.5)	0 (0.0)	
Post-operative period					**0.22**
Not assessed	7 (38.9)	2 (33.3)	0 (0.0)	1 (100.0)	
< 0.6	9 (50.0)	3 (50.0)	7 (87.5)	0 (0.0)	
0.6 – 1.0	1 (5.6)	1 (16.7)	1 (12.5)	0 (0.0)	
1.0 – 1.5	1 (5.6)	0 (0.0)	0 (0.0)	0 (0.0)	

No association between SGLT2i cessation timeframes (0–24 hours, 24–48 hours and ≥72 hours) and ketosis incidence pre-op (p = 0.11) and post-op (p = 0.22).

Conclusion

- Perioperative SGLT2i use and management was **not** associated with increased hyperglycaemia **or** reduced ketonaemia incidence before or after elective surgery.
- This data supports a **nuanced approach** for perioperative SGLT2i management.
- Further research including multicentre studies of extended duration to build sample size is essential to guide safe SGLT2i use.

References

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3.Hamblin PS, Wong R, Bach LA. Sodium-glucose cotransporter type 2 inhibitors: managing the small but critical risk of diabetic ketoacidosis. *Med J Aust*. 2020;212(7):294-296.e1. doi:10.5694/mja2.50525.

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