

## Evaluation of current practice for the perioperative management of sodium-glucose co-transporter-2 inhibitors and type 2 diabetes

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### Background

Sodium-glucose co-transporter-2 inhibitors (SGLT2i) have been associated with diabetic ketoacidosis (DKA), particularly in the perioperative period<sup>1,2</sup>. Current guidelines stipulate to withhold SGLT2i two days pre-operatively and on the day of surgery, and to recommence three days post-operatively<sup>2</sup>. There is little evidence on guideline compliance, and the effect this has on adverse glycaemic control and the incidence of DKA within the perioperative period.

### Aim

To investigate how perioperative SGLT2i management affects glycaemic control and the incidence of DKA in the perioperative period.

### Methods

This single-centre retrospective cohort study included patients with type 2 diabetes taking SGLT2i and matched patients not taking SGLT2i, seen in the pre-admission clinic (PAC) between 1<sup>st</sup> May 2019 and 30<sup>th</sup> April 2020, and underwent surgery by 30<sup>th</sup> September 2021.

#### Primary outcomes:

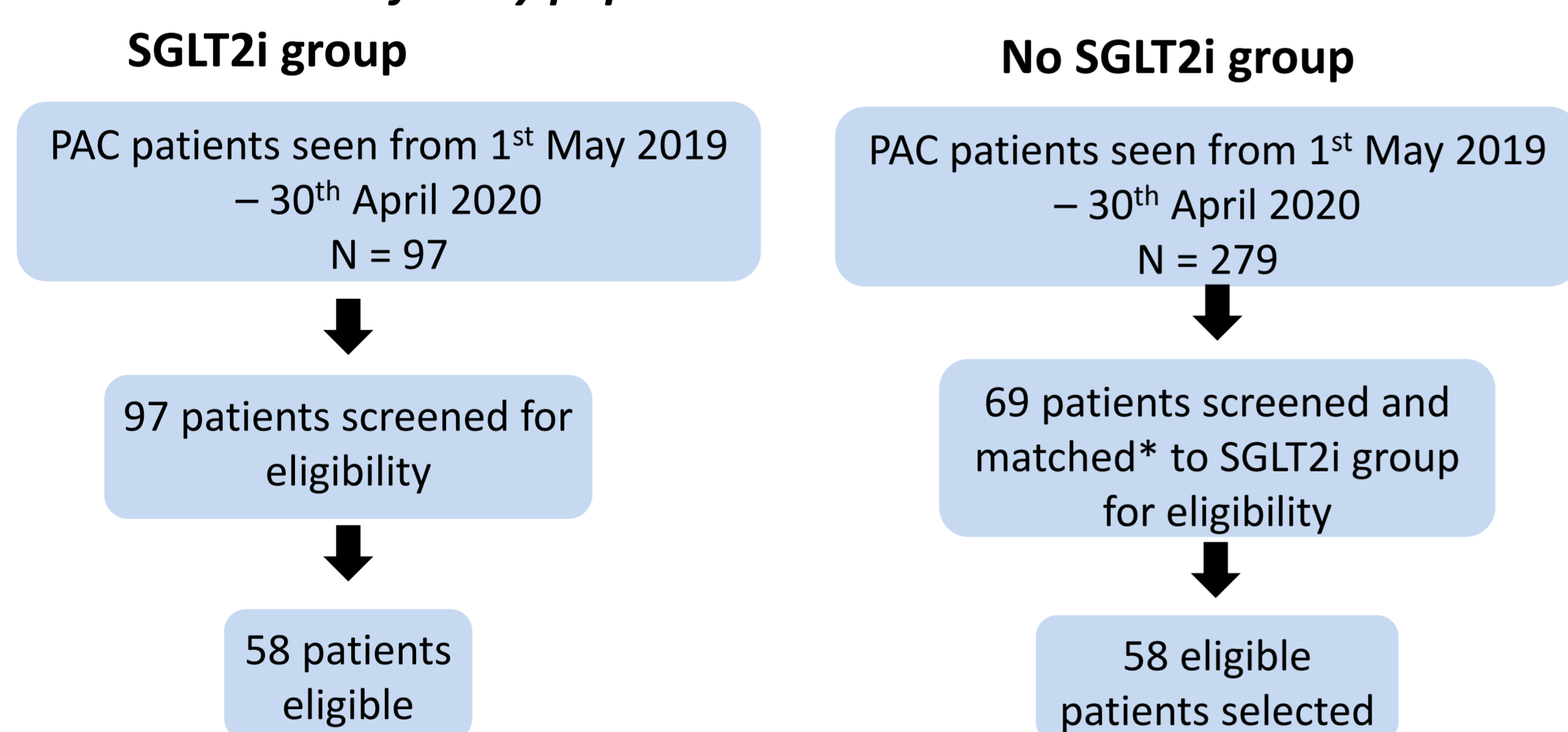
- Proportion of patients with SGLT2i withheld 2 days preoperatively, day of surgery and recommenced 3 days postoperatively
- Incidence of adverse glycaemic control from day of surgery through to day 3 post-operatively

#### Secondary outcomes:

- Incidence of DKA/euglycaemic DKA during admission, cancelled or delayed surgery due to poor glycaemic control or elevated ketones
- Incidence of complications due to adverse glycaemic control

### Results

Figure 1. Flowchart of study population



\*matched based on PAC month (+/- 1 month), surgical unit and where possible specific surgery too, age (+/- 10 years) and sex

Table 1. Baseline characteristics

Patient Factors	SGLT2i (n=58)	Non SGLT2i (n=58)	P-value
Male, n (%)	39 (67.2)	42 (72.4)	0.69
Age years, mean (SD)	65.7±11.1	67.2±11.8	0.50
BMI kg/m <sup>2</sup> , median (IQR)	30.9 (27- 35.5)	27.8 (24.6- 33.9)	0.24
eGFR mL/min, median (IQR)	73 (61- 90)	65.5 (52.3- 86)	0.19
HbA1c %, median (IQR)	7.5 (7.1- 8.4)	7.4 (6.7- 8.1)	0.36
LOS days, median (IQR)	3 (2- 6)	5 (2- 7)	0.17
Surgical unit, n (%)			
Cardiothoracic	22 (38.0)	22 (38.0)	0.99
General surgery*	15 (25.9)	13 (22.4)	
Neurosurgery	7 (12.1)	7 (12.1)	
Orthopaedic	3 (5.2)	3 (5.2)	
Urology	3 (5.2)	4 (6.9)	
Plastic Reconstructive Surgery	1 (1.7)	2 (3.4)	
Vascular	2 (3.4)	2 (3.4)	
Ear, Nose and Throat	2 (3.4)	2 (3.4)	
Other <sup>#</sup>	3 (5.2)	3 (5.2)	

SD = standard deviation, IQR = interquartile range

\*General surgery includes Breast and Endocrine Surgery, Oesophageal and Gastric Bariatric Surgery, Hepatopancreatobiliary Surgery, Colorectal Surgery

<sup>#</sup>Surgical unit "Other" includes Cardiology, Ophthalmology, Radiation Oncology

### Results

#### Primary outcomes:

Figure 2. SGLT2i patients compliant with perioperative guideline (n=58)

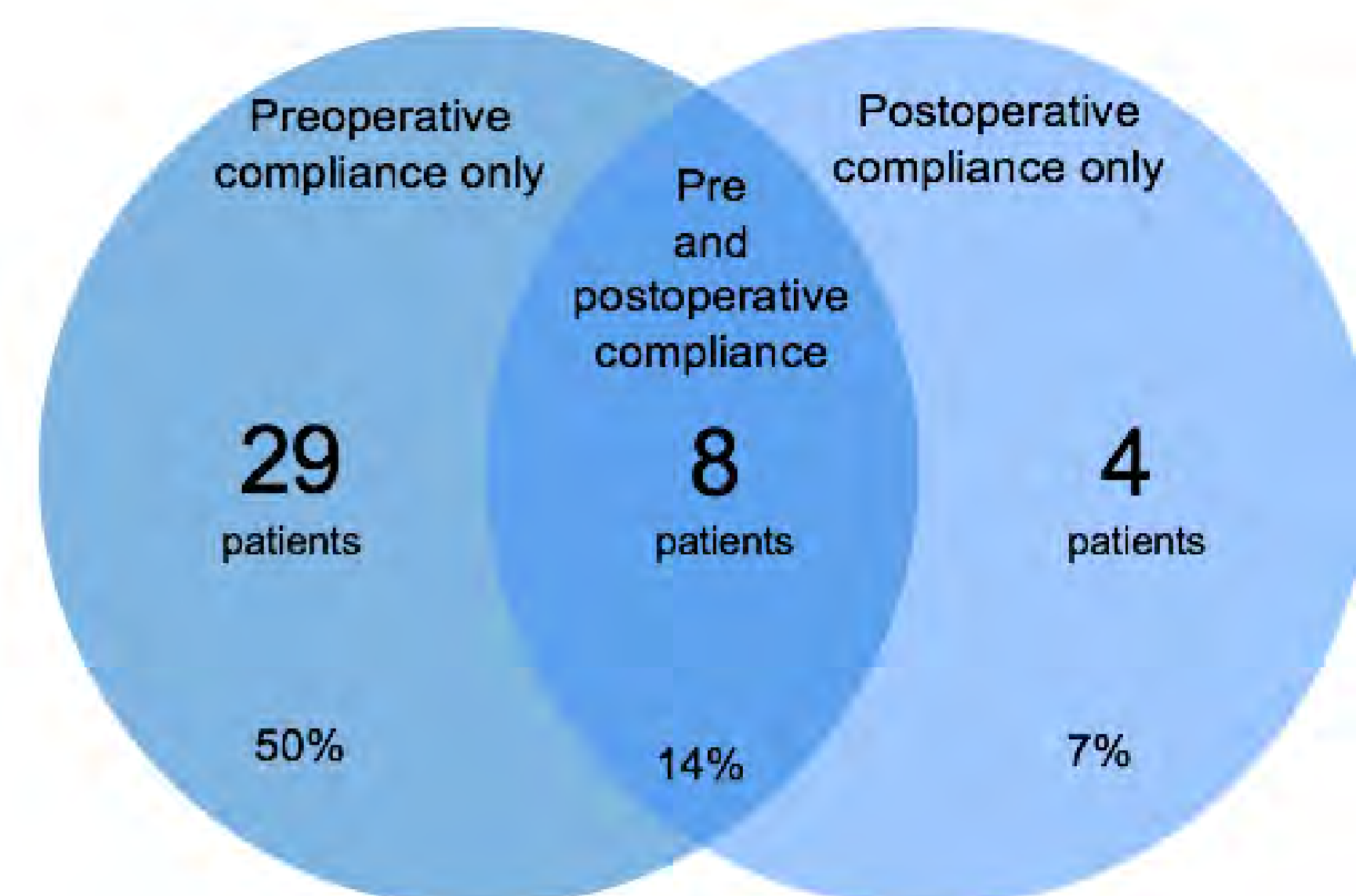
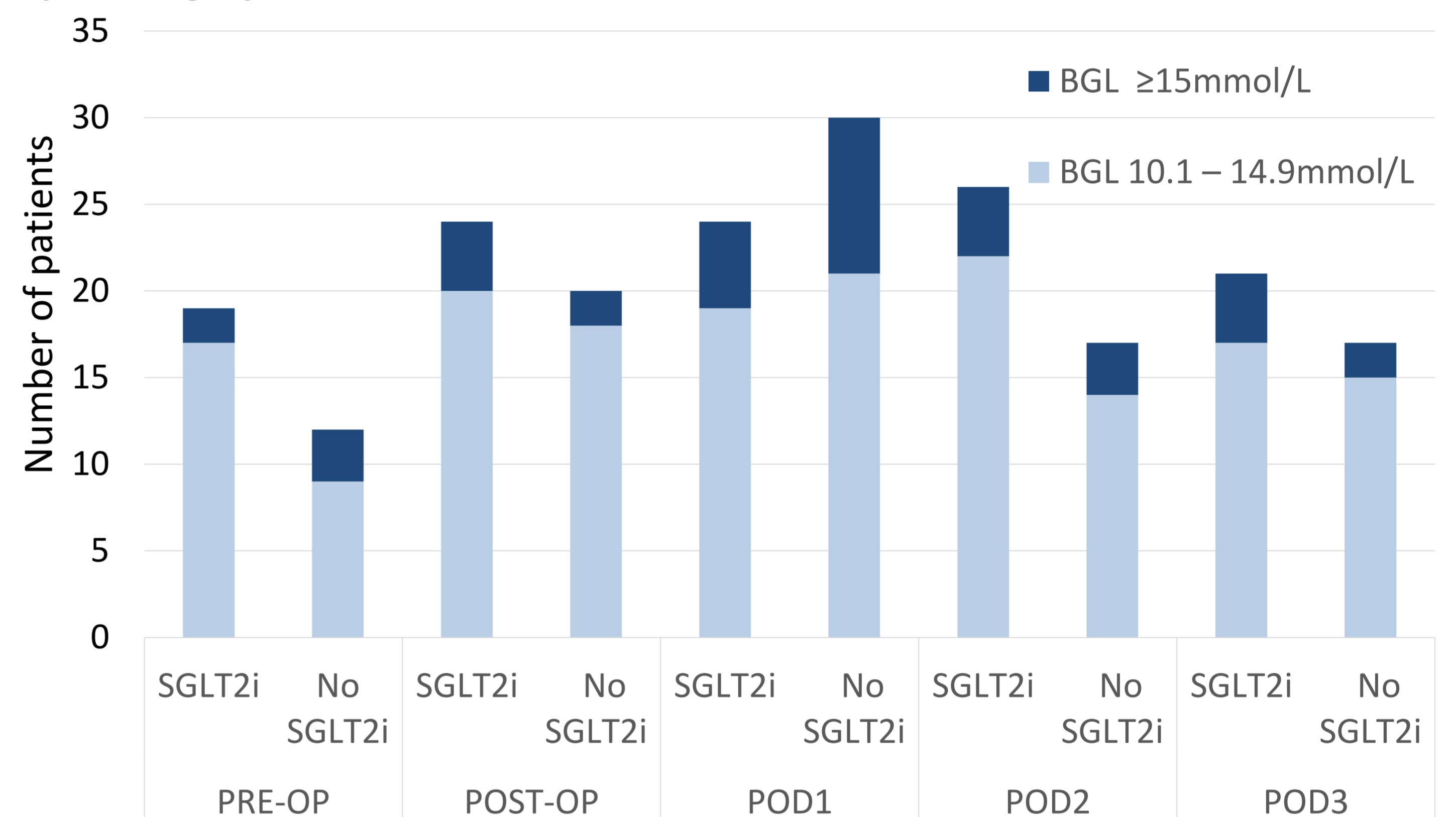


Figure 3. Incidence of hyperglycaemia from day of surgery through to day 3 post surgery



POD = post-op day

•Hyperglycaemia, (BGLs between 10.1 to 14.9mmol/L), occurred in 17 (29.3%) SGLT2i patients immediately prior to surgery and for 9 (15.5%) no SGLT2i patients (p=0.07).

•For SGLT2i patients, pre-operative hyperglycaemia (BGLs > 10mmol/L) occurred in 11 of 37 adherent patients and in 8 of 21 patients who were non-adherent to the guideline (p=0.51).

#### Secondary outcomes:

•DKA occurred in 1 (1.7%) patient in the SGLT2i group and in 2 (3.4%) patients in the no SGLT2i group (p=0.56).

•Euglycaemic DKA did not occur in either group.

•No complications occurred due to adverse glycaemia control.

### Discussion

Nearly two-thirds of patients prescribed SGLT2i demonstrated preoperative adherence to guidelines; the complexity of the instructions may be a deterrent to patient compliance.

The results suggest that the incidence of preoperative hyperglycaemia in patients prescribed SGLT2i may be greater than for other diabetic patients, implying that prolonged cessation of SGLT2i pre-operatively may contribute to poorer preoperative glycaemic control.

This study raises questions about the optimal duration of preoperative SGLT2i cessation, given the trend towards preoperative hyperglycaemia. It also highlights the need for initiatives to improve patient compliance with preoperative medication instructions.

### References

1. Perioperative Management of Diabetes Guideline. Alfred Health; 2018
2. Aust Diabetes Society. Severe Euglycaemic Ketoacidosis with SGLT2 Inhibitor Use in the Perioperative Period 2018. Available from: [https://diabetessociety.com.au/documents/2018\\_ALERT-ADS\\_SGLT2i\\_PeriooperativeKetoacidosis\\_v3\\_final2018\\_02\\_14.pdf](https://diabetessociety.com.au/documents/2018_ALERT-ADS_SGLT2i_PeriooperativeKetoacidosis_v3_final2018_02_14.pdf)