

A sweet but salty situation: Errors associated with insulin-glucose therapy when managing hyperkalaemia

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Background

The management of hyperkalaemia, a common presentation during a patient's hospital journey, is often mismanaged. Variable understanding of treatment guidelines between the multidisciplinary team introduces errors in administration and post-treatment monitoring, particularly with insulin-glucose therapy. The Institution for Safe Medication Practices has attributed errors when treating hyperkalaemia with incorrect insulin neutral dose and route, variability in glucose infusion rate and timing of administration and post-intervention monitoring.¹ Similarly, subcutaneous insulin was mistakenly administered due to familiarity with administration route rather than treatment guidelines.^{1,2} Despite the availability of evidence-based guidelines, until harm mitigation strategies are implemented, errors will continue to occur.

Objective

To investigate the error rate of prescribing and administration of insulin-glucose and subsequent blood glucose (BGL) monitoring in patients being treated for hyperkalaemia.

Results

Insulin-glucose therapy was administered in 285 patients. The appropriate dose of 10 units insulin neutral was administered in 94% (n=268) of patients. The insulin was incorrectly prescribed and administered subcutaneously in 23% (n=64) of patients. A further review of 16 randomised patients from this cohort identified 44% (n=7) of patients had glucose administered at the recommended rate. Evaluation of post intervention BGL monitoring found that 69% (n=11) of patients did not have BGLs conducted, 25% (n=4) patients were partially monitored and 6% (n=1) had complete BGL monitoring. Of those patients who received either partial or complete BGL monitoring (n=5), 40% (n=2) had a hypoglycaemic event after insulin-glucose.

Method

A retrospective cohort study was conducted at a tertiary hospital from January to September 2022. Dosage and route of insulin neutral was extracted from electronic medical records and collated. A further randomised sample assessed the timing of glucose 50% administration, compliance with recommended BGL monitoring, and hypoglycaemic events. The use of insulin-glucose therapy was assessed against the Therapeutic Guidelines to identify any deviation.

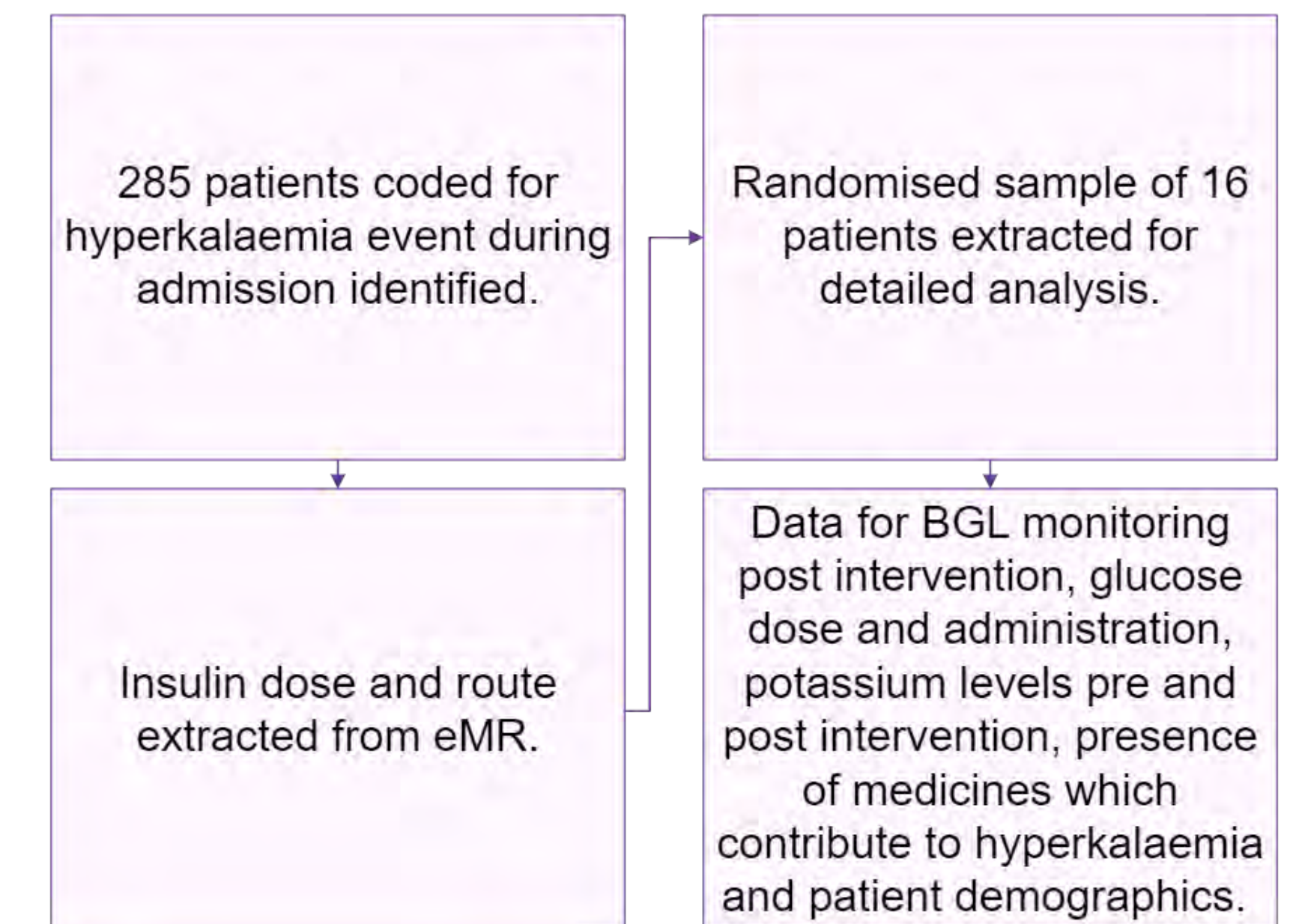
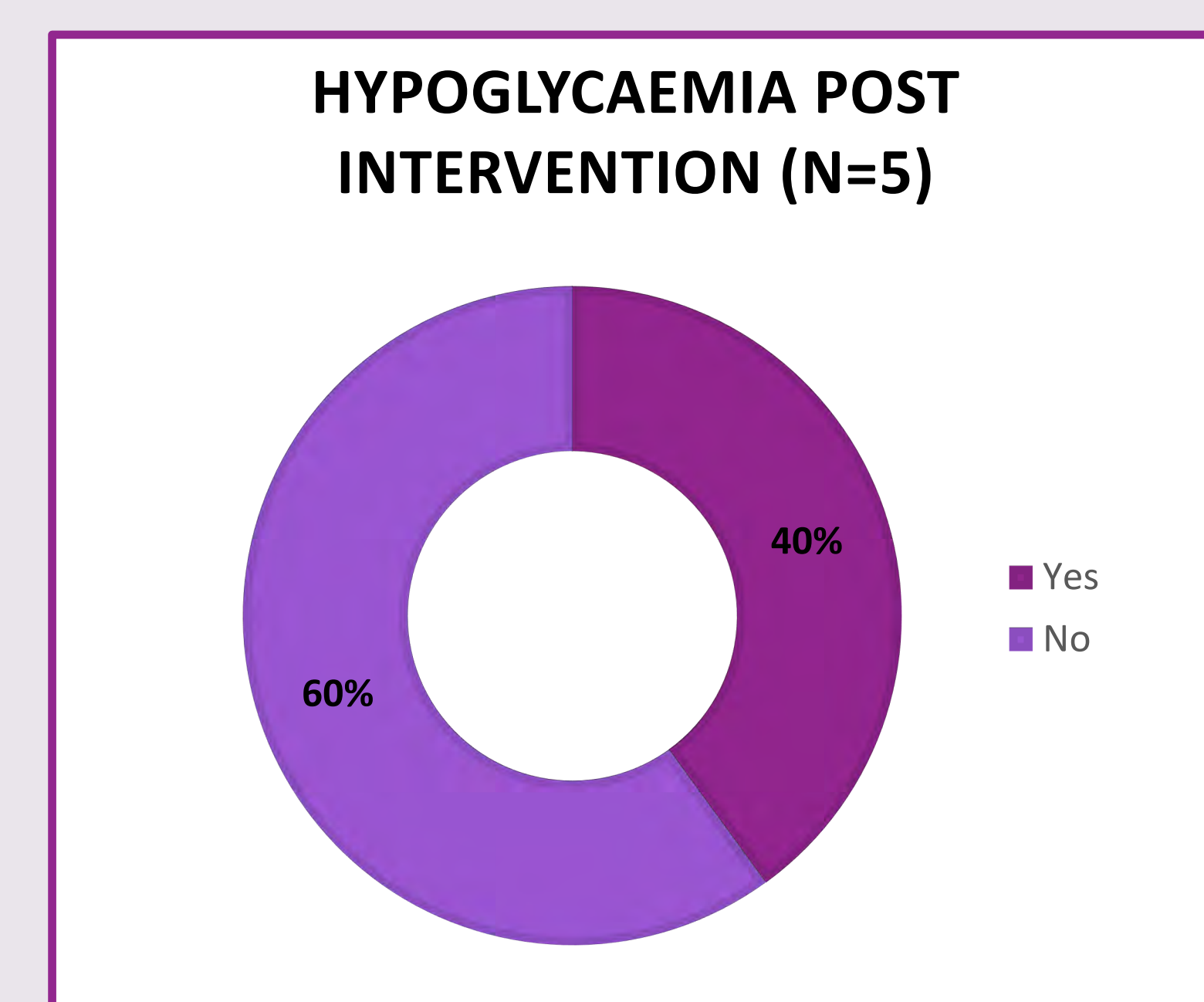
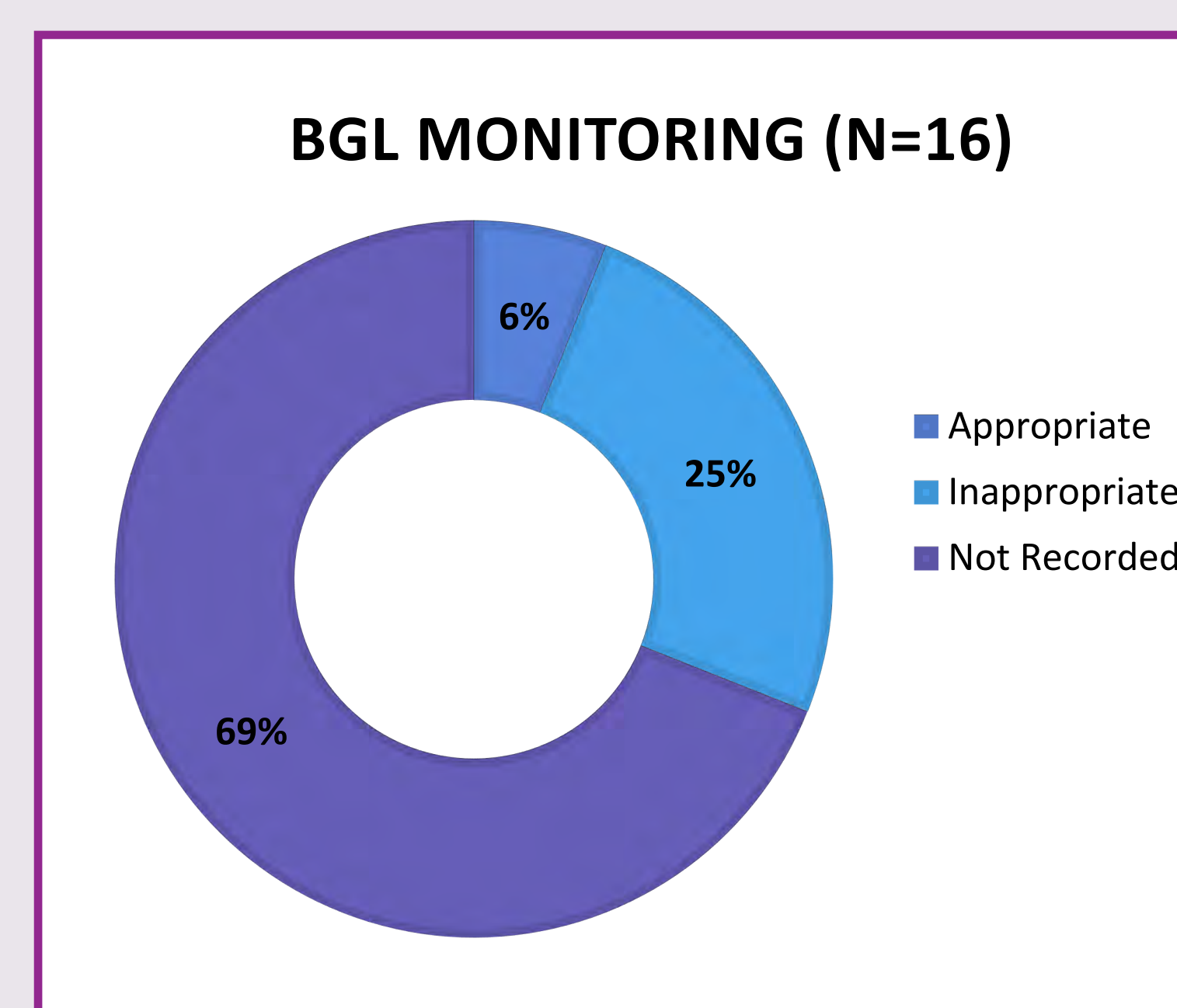
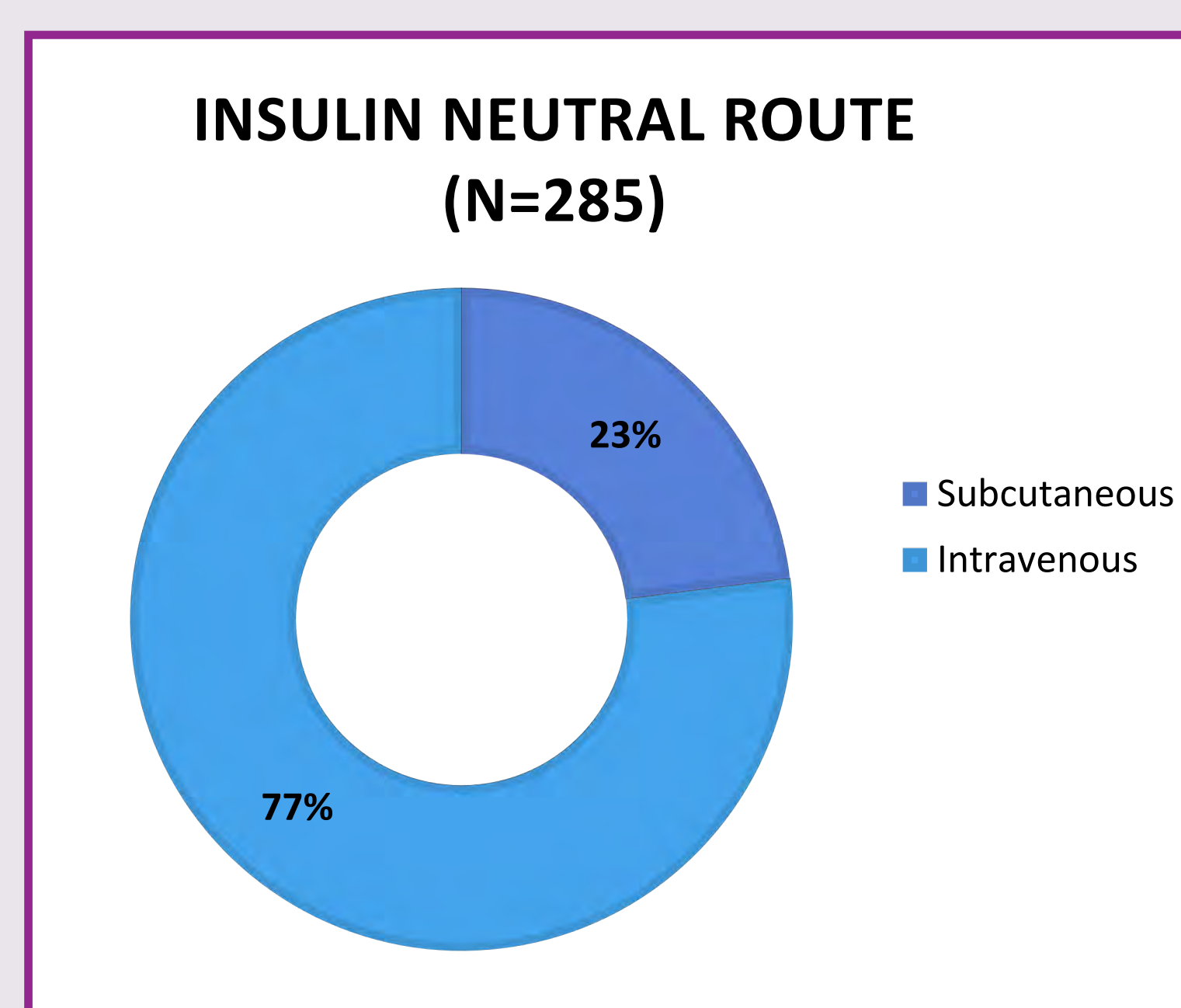


Table 1: Patient Demographics (n=16)

Gender (Male)	63%	Years of age (median)	78
History of CKD	44%	Baseline potassium (mean)	5.6 mmol
Hyperkalaemic medicine prescribed (n=11)	69%	Peak potassium (mean)	6.6 mmol
Hyperkalaemic medicine withheld (n=9)	82%	Post intervention potassium (mean)	5.1 mmol



Discussion

The use of insulin-glucose for hyperkalaemia, and post intervention monitoring often deviated from the Therapeutic Guidelines. The most common errors were incorrect administration route and noncompliance with BGL monitoring, which may result in detected and undetected iatrogenic hypoglycaemic events. The Institution for Safe Medication Practices has highlighted that incorrect route of administration mainly occurred when prescribing as hyperkalaemia order sets were not used or did not exist.¹ Clinical knowledge between healthcare professionals is another area that needs to be addressed, as the prescribing, administration and monitoring of high-risk medications change hands multiple times throughout treatment.³ Establishing standardised protocols and integrated systems will address discrepancies between dose and route of insulin neutral, dose and rate of glucose infusion as well as BGL monitoring parameters.³

Conclusion

Pharmacists play a key role in harm mitigation when using high-risk medications for the treatment of hyperkalaemia. Errors in prescribing and administration of insulin neutral have significant implications for patients with elevated serum potassium levels. Similarly, compliance with recommended glucose infusion rates and blood glucose monitoring ensure patient safety when treating hyperkalaemia.

To reduce errors when managing hyperkalaemia, quality improvement interventions such as comprehensive electronic clinical decision support tools and continuing multidisciplinary education for high-risk medications must be implemented. The use of hyperkalaemia prescribing order sets embedded into point of care software, have been shown to reduce variability and prevent common prescribing errors and provide healthcare professionals monitoring prompts, and may pose a solution to this situation.⁴

References

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