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Editorial

The Use of Clinical Pathways and Order Sets in the Management of Diabetic Ketoacidosis

Diabetic ketoacidosis (DKA) is a common complication of both type 1 and type 2 diabetes in children and adults that is associated with significant morbidity and mortality. Clinical practice guidelines (CPGs) for DKA (1,2) have been used by many teaching hospitals to develop local DKA management guidelines. Despite widespread availability of CPGs, adherence rates remain low (3–5). Many patients present to community hospitals where protocols may not be readily available and the variability in management can be wide (6). The use of standardized clinical care pathways with established order sets have been shown to increase adherence to CPGs and decrease hospital costs and length of stay (6–9).

In this issue are 3 papers addressing DKA management, including adherence to CPGs and the implementation of DKA order sets in pediatric and adult tertiary care settings in Canada. The first is a retrospective cohort study by Galm et al of patients admitted to 3 teaching hospitals (2 tertiary care and 1 community) in Edmonton, Alberta (10). Among the community feeder hospitals, only 1 of 14 had a standardized DKA protocol. Although the management of DKA was overall quite good, 4 notable areas for potential improvement were identified. These included 1) insufficient potassium replacement leading to hypokalemia in 41.7%, 2) giving a bolus of insulin to nearly 1 in 4 patients despite recommendations against this in the latest Diabetes Canada guidelines, 3) inappropriate use of bicarbonate, usually as a bolus (rather than slow infusion) or with only moderate DKA and 4) discontinuation of intravenous insulin before converting to subcutaneous insulin in 1 in 4 cases.

The paper by Clark et al (11) evaluates the impact of the implementation of an order set in 2013 at a tertiary care centre in Kingston, Ontario. Uptake of the order set was good at 84% of DKA admissions. There was no significant difference between the groups for the outcomes measured including occurrences of hypokalemia, hypoglycemia and time to normalization of anion gap. It would be interesting to know the adherence rates to CPGs pre- and postimplementation of the order set.

Flood et al (12) report on the uptake of a pediatric DKA order set and the impact of standard-of-care DKA management in a tertiary care centre in Saskatoon, Saskatchewan. They describe the process of the development and implementation of the order set, including stakeholder engagement, which is key to change management. Similar to Kingston, they observed 83% uptake of the order set. Significant improvements in adherence to standard of care management were observed in intravenous (IV) fluid rates, earlier and more appropriate addition of potassium to IV fluids and earlier addition of IV dextrose.

While protocols exist in many larger teaching centres, the challenge is identifying a mechanism for order sets to be available in smaller centres. While the volume of patients with any one condition may be low in these centres, at a national level, we know that the majority of emergency department (ED) visits are occurring in community hospitals where standardized resources may reduce the variability in care. Difficulties in getting the right resources and training have been cited as barriers to providing the best possible care in these settings. To this end, the Translating Emergency Knowledge for Kids (TREKK) group recognized that 85% of Canadian children who need emergency care are treated in general EDs that are not part of a children's hospital. TREKK provides an online repository of trusted, user-friendly evidence-based resources that includes bottom line recommendations, algorithms and order sets accessible through the trekk.ca website. The Canadian Pediatric Endocrine Group (CPEG) are developing national ongoing DKA management guidelines for care beyond the ED, in collaboration with colleagues in pediatric emergency medicine and pediatric intensive care. Order sets are an important component of these resources for all the reasons cited in the papers featured in this issue.

As stated by Galm et al (10) given Canada's geography, transfer criteria and simple guidelines in the form of preprinted order sets or protocols are important, particularly for low-volume centres. These order sets need to provide direction while still allowing for clinical judgement and to be adaptable to local availability of resources and criteria-based progression. One concern with order sets is that clinicians become overly reliant on them and less likely to adapt to changes in the patient's status. Ideally order sets would be linked to a clear and concise document providing the rationale for the recommendations and guidance on how to adapt management based on the clinical course. Consideration should be made to including such integrated clinical pathways as part of future CPGs for conditions such as DKA.

Author Disclosures

Conflict of interest: None.

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