

BACKGROUND:

Blood sugar measurement is a quick and easy point of care test. Although it forms an important part of the assessment of an unwell child, there is no clear guideline as to when it should be taken. It should be performed at triage, as part of the first set of observations, in all children with presentations that put that child at risk for either hypoglycemia or hyperglycemia.



OBJECTIVES:

1. Audit to identify:
 - the percentage of unwell children having a blood sugar measurement taken at triage
 - which presentations prompted a blood sugar measurement
 - to obtain data regarding the prevalence of hypoglycemia and hyperglycemia in children presenting to this department.
2. Introduction of guidance for presentations requiring a blood sugar to be checked, and education around same.
3. Re-audit to assess the effectiveness of the guideline and identify any impediments to compliance

AUDIT

AUDIT:

The audit consisted of a retrospective chart review of all patients meeting inclusion criteria that presented to the Emergency Department over 7 consecutive days.

Inclusion criteria:

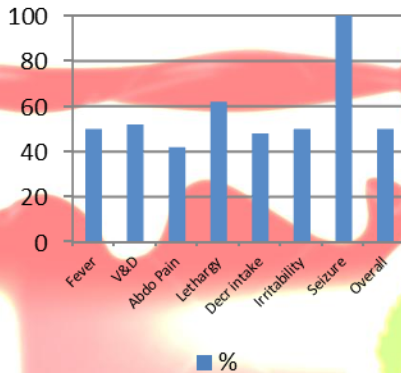
- age <14 years
- presenting complaints of: fever, vomiting, diarrhoea, abdominal pain, reduced oral intake, lethargy, or seizure.

RESULTS:

Of the 70 patients that met the inclusion criteria, 35 had a blood sugar checked. The incidence across the different presentations is shown in Graph 1, with most being in the range of 40-60%. Presenting with a seizure guaranteed it being checked.

Of the 35 blood sugar measurements, 5 were outside the normal range; 4 hypoglycemic readings, and 1 hyperglycemic reading (a new diagnosis of Diabetes Mellitus).

Graph 1: Percentage of patients having blood sugar measurement according to presenting complaint



INTERVENTION:

The results of the audit were presented at departmental teaching. Each triage nurse was also contacted by the author to explain the rationale behind the importance of this test, and the new recommendations for when to check a blood sugar.

A poster outlining the above was also created and displayed in both triage rooms (Image 1).

PASS ME THE SUGAR, SUGAR!

Reasons to take a BM:

- ❖ Fever in an 'unwell looking' child
- ❖ Vomiting, Diarrhoea & Abdo pain
- ❖ Reduced oral intake
- ❖ Lethargy
- ❖ Irritability
- ❖ Polyuria & Polydipsia
- ❖ Seizure
- ❖ Age <6mo



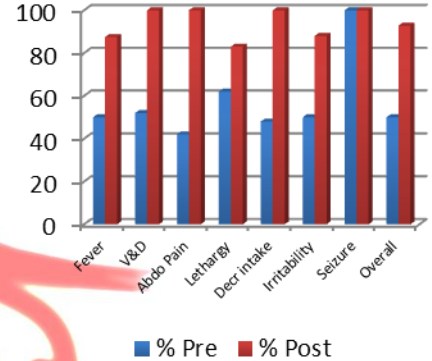
Image 1. Poster displayed in triage rooms

RE-AUDIT:

A second audit was performed post intervention, using the same method and time period as for the initial audit.

Of the 28 children audited, 26 had a BSL taken (92%), with a distribution across presenting complaints as demonstrated in graph 2. Of those taken, there was 1 hypoglycemic reading.

Graph 2: Comparison of blood sugar measurement pre and post guideline introduction



DISCUSSION:

It is imperative that we quickly identify and facilitate treatment of both hypoglycemia and hyperglycemia, conditions which children are particularly vulnerable to^{1,2,3}. Our initial audit found that a blood sugar level was checked in 50% of selected patients at triage.

With the use of education and the introduction of a guideline for its appropriate use, our compliance improved to >90%.

Given the simplicity, low cost and relative non-invasiveness of taking a BSL, we feel this test belongs in the routine assessment of an unwell child. By introducing a blood sugar measurement into the triage assessment, we hope to ensure that this test is performed promptly, and avoid the deleterious effects of undiagnosed hypo- and hyperglycemia.

References:

1. Chausain JL, Georges P, Calzada L, Job JC. Glycemic response to 24-hour fast in normal children: III. Influence of age. J Pediatr 1977; 91:711.
2. Haymond MW, Sunehag A. Controlling the Sugar Bowl; Regulation of glucose homeostasis in Children. Endocrinol Metab Clin North Am 1999; 28:663
3. Rewers A, Klingensmith G, Davis C, et al. Presence of Diabetic Ketoacidosis at diagnosis of Diabetes Mellitus in youth: the Search for Diabetes in Youth Study. Pediatrics 2008; 122:1:e1258