Effect of Hyperglycemia on Postoperative Outcome in Pediatric Surgical Unit

Thesis

Submitted for the partial fulfillment of MSc. Degree in Pediatrics

By

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بسم الله الرحمن الرحيم

(قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا
إِنَّكَ أَنتَ ۘ الْعَلِيمُ الْحَكِيمُ)

صدق الله العظيم

سورة البقرة الآية (32)

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Hassan Mohammed Abbas

الحـالات وطـرق البحـث

الحالات:

سيتم إجراء هذه الدراسة كدراسة حالات معتمدة على مجموعة ضابطة، وسوف تشمل 30 طفلاً من حديثى الولادة والأكبر سناً وبهم شق جراحى بعد الخضوع لعملية جراحية بالبطن.

سيتم تجميع الحالات من داخل الرعاية المركزة بقسم جراحة الأطفال بمستشفى الأطفال بجامعة عين شمس.

معايير الإنضمام للدراسة:

1- العمر: من عمر يوم وحتى 18 عاماً.

2- الأطفال الذين بهم شق جراحى بعد الخضوع لعملية جراحية بالبطن أو جراحات القلب والصدر أو الجراحات البولية التناسلية.

معايير الإستبعاد من الدراسة:

1- المرضى المصابين بالسكر.

2- المرضى المعرضين لعدوى بشق جراحى سابق قبل الخضوع للعملية الجراحية الحالية.

3- الجروح الملوثة.

طرق إجراء البحث:

سوف يخضع جميع المرضى المشتركين فى الدراسة للإجراءات التالية:

1- أخذ التاريخ المرضى الكامل ويتضمن: العمر والنوع وسبب الإقامة بوحدة الرعاية المركزة لجراحة لأطفال.

2- عدد أيام الإقامة بوحدة الرعاية المركزة لجراحة لأطفال، ونتائج العملية الجراحية بعد 48 ساعة من إجراء الجراحة (من خلال تحديد مستوى الجلوكوز بالدم).

3- الأدوية الخاصة بعلاج ارتفاع السكر بالدم.

4- وجود تسرب توصيلى واضح بالجرح.

5- وجود عدوى أخرى تتطلب تناول المضادات الحيوية.

6- مؤشر المُراضة المشتركة (وجود أمراض مصاحبة).

7- أسباب الخضوع للجراحة (سواء كانت خبيثة أو حميدة).

8- نوع التوصيل (لفائفى قولونى، أو قولونى قولونى).

9- تصنيف الجرح (نظيف، ملوث، أو الملوثة النظيفة).

10- مدة إجراء الجراحة.

List of Contents

List of Tables

List of Tables (Cont...)

List of Figures

Introduction

Hyperglycemia in perioperative patients has been identified as a risk factor fro morbidity and mortality ***(Lipshutz and Gropper, 2009).***

Intensive insulin therapy (IIT) has been shown to reduce morbidity and mortality among the critically ill, decrease infection rates and improve survival after surgery ad improve outcomes in acute neurological injury and acute myocardial infarction ***(Lipshutz and Gropper, 2009).***

Surgical site infection (SSI) is a well known cause of morbidity in united state, the third most common nosocomial infection, it account for 14% to 17 % of all hospital acquired infection. In surgery SSI is the most common nosocomial infection (38%) ***(National Nosocomial Infection Surveillance System, 2004).***

SSI prolongs the hospital length of stay after surgery & increases re-hospitalization & dramatically increases the use of emergency services & health care cost (***Shilling et al., 2008).***

Surgical intensive care patient population improved glucose during the 1St 48hr immediately

following surgery has been clearly linked with a reduction in major infection ***(Furnary et al., 2004).***

This association appears to be independent of preoperative glycemic control and the dose of insulin infused post operative ***(Trick et al., 2000).***

Studies demonstrated that even short term period (6-24hr), exposure to hyperglycemia impairs all function of healing power ***(Blondet et al., 2007).***

Aim of the Work

To determine the prevalence of hyperglycemia among pediatric postoperative patients, its impact on outcomes, and whether hyperglycemia can be controlled effectively in this population.

INTRODUCTION

Stress hyperglycemia is a medical term referring to transient elevation of the blood glucose due to the stress of illness. It usually resolves spontaneously, but must be distinguished from various forms of diabetes mellitus. The stress response is the human body's reaction to anything that throws off the balance inside it, e.g. injury, infection, fear, exercise, or pain that cause changes in hormonal and mechanical balance.

Stress alters cortisol and lipid metabolism that appears in critical illness as diabetic ketoacidosis, hyperglycemic hyper-osmolar coma which require specific management by fluids, insulin and regulation of metabolic changes and also treatment of complications that may occur during stay in ICU.

Myocardial infarction is one of the most common causes of stress hyperglycemia which worsens the prognosis of the disease. In cerebral stroke, stress hyperglycemia increases ischemic area and affects the clinical progression of stroke which may change the treatment especially thrombolytic therapy. The stress in burns causes many hormonal changes which lead to hyperglycemia. This increases rate of infection, delays healing of wounds and prolongs hospital stay.

Surgery in traumatized patients changes blood glucose level and causes stress hyperglycemia. This is more likely in cases of undiagnosed diabetes or urgent surgery. Sepsis causes metabolic changes and increases morbidity and mortality. Stress hyperglycemia may also occur in other diseases such as acute pancreatitis and acute renal failure.

In pediatric critical illness, stress hyperglycemia may be transient or may develop into diabetes mellitus.

Chapter 1

BODY RESPONSE TO STRESS

Endocrine response to stress

The effect of severe trauma, disease, infection, and surgery can result in remarkable metabolic stress on the human body. Survival of such insults depends in great part upon a functioning neuro-endocrine system. The initial response to stress results in energy conservation toward vital organs, modulation of the immune system and a delay in anabolism. This acute response to critical illness is generally considered to be an appropriate one.

The body's response to protracted critical illness (weeks to months) also results in marked neuro-endocrine changes. Whereas many of the chronic endocrine responses are similar to the acute phase, research is revealing that the two entities do have distinct differences ***(Van den Berge, 2002a)*.**

The endocrine response to this prolonged critical illness can even be maladaptive. Protein breakdown and fat deposition often proceed unchecked, resulting in what has been described as a "wasting syndrome". In addition, a persistent hyperglycemic response and insulin resistance can