Cow's Milk Protein Allergy Post Gastrointestinal Tract Surgeries Among Infants AND Children

Thesis

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Safaa Aly

List of Contents

List of Tables

List of Tables

List of Tables Cont...

List of Figures

List of Figures Cont...

List of Abbreviations

Abb.	Full term
AAF	Amino acid formula
AD	Atopic dermatitis
ADHD	Attention Deficit Hyperactivity Disorder
APCs	Antigen-presenting cells
ASDs	Autism spectrum disorders
ASPGEU	Ain shams pediatric surgery department and Pediatric Gastro- entrology Unit
BLGA	Beta-lactoglobulin, the genetic variants A
BPR	Bleeding Per Rectum
CD	Celiac disease
CM	Cow's milk
CMPA	Cow's milk protein allergy
COMISS	Cow's Milk-related-Symptom-Score
DBPCFC	Double-blind, placebo-controlled food challenge
ED	Elemental Diet
eHF	Extensively hydrolyzed infant formula
ESBS	Extremely short bowel syndrome
ESPGHAN	European Society of Pediatric Gastroenterology, Hepatology, and Nutrition
GIT	Gastrointestinal tract
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HMOs	Human milk oligosaccharides
IBR	Institutional Review Board
IgE	Immunoglobulin E
lcFOS	Long chain fructo-olgosaccharides
LT	Liver transplantion
MHC	Major Histocompatibility Complex
OFC	Oral food challenge

List of Abbreviations Cont...

Abb.	Full term
PAL	Precautionary allergen labeling
PN	Parenteral nutrition
PPV	Positive predictive values
RYGB	Roux-en-Y gastric bypass
SBBO	Small-bowel bacterial overgrowth
SBS	Short bowel syndrome
scGOS	Short chain galacto-oligosaccharides
SCORAD	SCORing Atopic Dermatitis
sIgE	Specific IgE
SPT	Skin prick test
SPTs	Skin prick tests
TCR	T cell receptors
TGF-beta1	Transforming Growth Factor Beta 1
Th	T helper
TH2	T helper cells
Treg	T regulatory cells
WAO	World Allergy Organization

INTRODUCTION

Cow's milk allergy is the most common food allergy in early childhood, affecting 2-5% of the children less than three years ***(Huang and Kim, 2012).***

Symptoms and signs related to cow's milk protein allergy (CMPA) may involve many different organ systems, mostly the skin, the gastrointestinal tract and the respiratory tracts. The involvement of 2 systems increases the probability of CMPA, where's some symptoms are more likely to be present in children with a positive test for CMP-specific IgE (eg, angioedema, atopic eczema) ***(Shek et al., 2005).***

Diagnostic procedures, the first step is through medical history and physical examination. If any of the features occur in an infant or child and cannot be explained by another cause, CMPA may be considered a potential diagnosis. In most cases with suspected CMPA, the diagnosis needs to be confirmed or excluded by an allergen elimination and challenge procedure. For clinical practice, the determination of specific IgE in a blood sample and the skin prick test (SPT) are useful diagnostic tests at any age, but a combination of the 2 tests is not necessary for the diagnostic workup ***(Boyce et al., 2011).***

A Cow's Milk-related-Symptom-Score (COMISS), a score that considers general manifestations, dermatological, gastrointestinal and respiratory symptoms, was developed to be used as an awareness tool for cow's milk related symptoms

(Vandenplas et al., 2015). The COMISS score can also be used to evaluate and quantify the evolution of symptoms during a therapeutic intervention. However, the COMISS score does not diagnose CMPA and does not replace a food challenge. Its usefulness needs still to be evaluated by a prospective randomized study ***(Vandenplas et al., 2016).*** Three separate clinical trials were conducted to investigate the nutritional adequacy of therapeutic formulas in infants less than 6 months old suspected of having cow's milk related symptoms, Efficacy was measured in terms of the results of a challenge test and the symptom based score, COMISS, the results of the pooled analysis confirm that the COMISS score may be a sensitive and specific awareness tool for health care professionals to select infants suspected to present with cow's milk related symptoms ***(Vandenplas et al., 2016).***

Strong association between surgeries in young age and cow’s milk protein allergy is suspected, on one hand, many cases of CMPA was misdiagnosed as intestinal malrotation while they were primarily allergic ***(Kawano et al., 2006),*** When physicians encounter infants with suspected surgical gastrointestinal disease, including intestinal malrotation, they should consider cow’s milk allergy as a differential diagnosis or complication and should utilize food challenge tests for a definitive diagnosis ***(Matsuki et al., 2012).***

On the other hand, many cases developed CMPA post surgery. In recent years it has been suggested that the development of CMA after gastrointestinal surgery in newborn

infants is due to an immune function. In addition, the development of CMA might be synergistically exacerbated by congenital abnormalities of the intestinal mucosa, general conditional changes and local damage to the intestine by invasive surgery, and poor pre- or post-surgical nutrition ***(Kawano et al., 2006).***

The association between CMA and SBS (short bowel syndrome) could be based on some specific pathophysiological characteristics of the SBS patients. First of all, a low digestive capacity may have a role in the high incidence of food allergy. As their peptic digestion is not complete during early life, protein remnants of the diet could act as allergens. Studies on the use of anti-acid drugs have clearly linked the impairment of gastric function with sensitization against oral proteins and drugs ***(Diamanti et al., 2015).***

Not only gastroenterological surgery leading to SBS is associated with a high incidence of food allergy, but also gastrointestinal atresia, Hirschsprung disease, congenital diaphragmatic hernia, perforation of the ileum, necrotizing enterocolitis, exomphalos, and hepatic transplantation surgery, have been linked to CMA. It is possible that a dysfunction of the gastrointestinal tract resulting from primary diseases, surgical invasion, small-bowel bacterial overgrowth (SBBO) and/or atrophy in the intestinal mucosa caused by extended fasting before and after surgery have a role in CMA inception ***(Wisniewski et al., 2012).***

AIM OF THE WORK

We hypothesize that Cow's milk protein allergy is higher in children post GIT surgical operation than in general population. The aim of this study is to detect the prevalence rate of occurrence of cow's milk allergy among young children who undergo GIT surgical operations and compare it with other children undergoing simple operations not involving GIT tract as circumcision and inguinal hernia as representative of the general populations subjects to anesthesia and surgery circumstance to avoid the bias.