Adverse effects of the new generation of Rotavirus vaccine in Egyptian infants

Thesis submitted for partial fulfillment of Master Degree in Pediatrics

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"وَقُل رَّبِّ زِدْنِي عِلْمًا"۝

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In the name of Allah, most gracious, most merciful.

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I hope he would have been proud.

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List of abbreviations

ACIP: Advisory Committee for Immunization Practices

CDC: Centers for Disease Control

EIA: enzyme immunoassay

FDA: *Food and Drug Administration*

GAVI Alliance: The Global Alliance for Vaccines and Immunizations

NA: Neutralizing Antibodies

NCDDP: National Clinical Dataset Development Programme

NICU: neonatal intensive care unit

NSP: Non-Structural proteins

ORS: oral rehydration solution

PATH: The Pan American Health Organization

RVGE: Rotavirus gastroenteritis

RNA: Ribo-nucleic Acid

RT-PCR: Reverse Transcription–Polymerase Chain Reaction

VAERS: Vaccine Adverse Event Reporting System

VSD: Vaccine Safety Datalink

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Introduction

Diarrheal disease continues to be one of the leading health problems in the world & may account for as many as 4.5 to 5 million death per year in children less than 5years old in developing countries ***(walker et al., 1994).***

Throughout the world, Rotaviruses are the single most important etiological agents causing severe diarrhea in infants & children with the 1st 5year of their life ***(kopithion et al., 2001).***

Acute infantile diarrhea is the leading cause of death among Egyptian children, accounting for more than 90%of the death in children less than 2years. In Egypt, with its population of about 60 million in 1995, 10% are children under 5years. A child under 5years suffers an average 3 bouts of acute diarrhea yearly ***(NCDDP, 1996)***.

Speaking of diarrheal disease, it is one of the leading problems in the world & it is the commonest cause of morbidity among Egyptian infants ***(Gaber, 1990).***

Because of the high burden of disease in both developed and developing countries, the need for an effective vaccine against the disease has been recognized by the Centers for Disease Control and Prevention, the World Health Organization (WHO) ***(Cunliffe et al., 1998)***, PATH, the Pan American Health Organization, and the GAVI Alliance (formerly known as the Global Alliance for Vaccines and Immunizations). There are 2 newly licensed rotavirus vaccines and several vaccines still under development ***(Dennehy, 2005)***.

The *Rotarix*™ vaccine, a live-attenuated vaccine, strategy is based on evidence from studies indicating that the first two natural human rotavirus infections protect against subsequent severe rotavirus illness, and provide heterotypic protection against multiple rotavirus strains ***(Velazquez et al., 1996)***.

Aim of work

The aim of the study is to study the prevalence of the common side effects of ROTARIX vaccine and its implication on parents' satisfaction in Egypt during the period from February 2009 till October 2010, through a questionnaire answered by the parents to follow up vaccinated infants and children and to know parents' opinion about the vaccine.

Rotavirus

Epidemiology

Rotavirus infection is the most common cause of severe diarrhea globally, resulting in an estimated 114 million episodes of gastroenteritis, 24 million outpatient visits, and 2.4 million hospitalizations each year ***(Glass et al., 1996)***.

In total, there were over 500,000 deaths attributed to rotavirus in 2004, resulting in 5% of all deaths in children, 5 years of age ***(Dennehy et al., 2008; Parashar et al., 2009)***. The rate of rotavirus illness is similar in both developed and developing countries; in all settings, rotavirus is responsible for approximately 39% of hospitalizations due to diarrhea regardless of a country's income status ***(Parashar, 2006)***.

However, the burden of mortality is almost entirely in developing countries where access to care is limited and risk factors for disease are high. Every year, greater than

86% of deaths occur in Asia and sub-Saharan Africa, whereas less than 1,000 rotavirus deaths occur in high-income countries ***(Parashar et al., 2009)***.

Rotavirus gastroenteritis occurs almost exclusively in infants and children, with nearly every child having been infected by the age of 5 years ***(Bernstein et al., 2009)***. The majority of serious infections occur between 4 and 24 months of age, although the peak age of serious disease varies globally ***(Podewils et al., 2004)***. In developing countries, the mean age of symptomatic rotavirus infection is between 6 and 9 months while industrialized countries have a median age between 9 and 15 months ***(Bresee et al., 1999)***.

Older children are protected from serious disease by previous exposure and apparent infection: if it occurs, it is usually mild ***(Velazquez et al., 1996).*** Similarly, disease can occur in neonates but is typically mild or asymptomatic due to protection from maternal antibodies ***(Glass et al., 2005)***.

Rotavirus infection shows strong seasonal variation; in temperate high-income countries, rotavirus disease occurs most often during the winter, whereas seasonality is less pronounced in tropical and low-income countries ***(Bresee et al., 1999).***

Differences between developed and devevoping counteries:

Although the incidence of Rotavirus in developed and developing countries is similar,

These are significant difference in term of:

- The age, at which significant infection first occur
- Seasonality of virus, circulationand that's linked to difference in climate,
- Serotype prevalence,
- Data on the cost of the disease, which is not readily available in many developing countries,
- Mortality