INCIDENCE AND CARRIER RATES OF CAMPYLOBACTER ORGANISMS IN EGYPTIAN CHILDREN

THESIS

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Presented by

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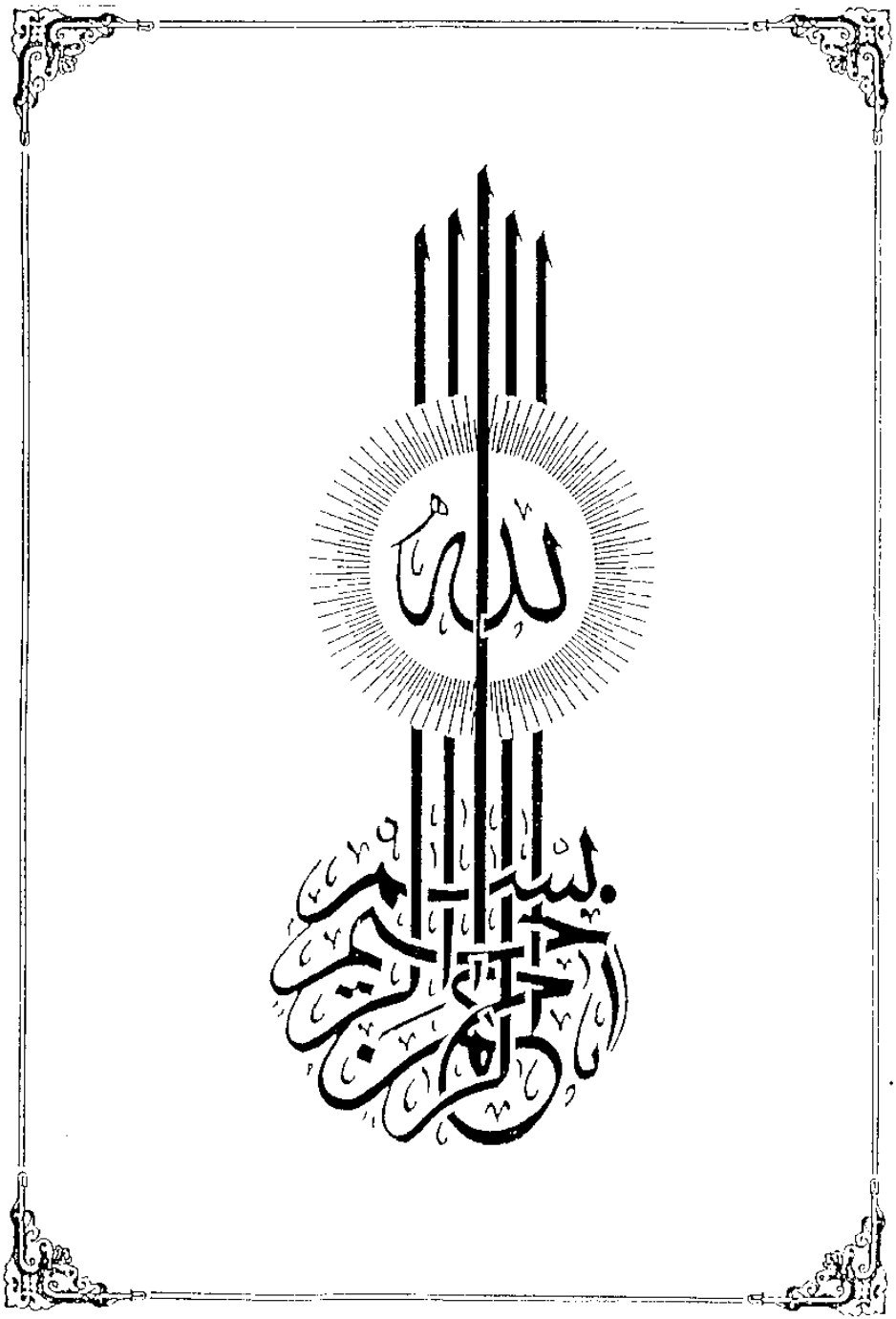
بسم الله الرحمن الرحيم

"عَلَّمَ الإنسَانَ مَا لَمْ يَعْلَمْ"

صدق الله العظيم

" سورة العلق ـ آيه ٥ "



C O N T E N T S

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INTRODUCTION AND AIM OF WORK

INTRODUCTION

Campylobacter jejuni is now recognized as one of the leading bacterial causes of gastroenteritis in humans (Skirrow, 1977).

Success at isolating these organisms from feces in the late 1960s set the stage for the present explosion of knowledge about these Gram negative bacterial pathogens. Although these organisms were suspected to be a cause of acute enteritis in man as early as 1954, it was not until 1973 in Belgium, that it was first to be a common cause of diarrhea (Butzler et al, 1973).

Gastroenteritis due to a Campylobacter in infants and young children was first described by king (1957). She called the organism " related vibrio " (later it was called Campylobacter subspecies jejuni). In spite of king's earlier report, the condition was not recognized for a long time (Holt, 1977).

Workers in the United Kingdom (Skirrow, 1977); Netherlands (Severin, 1978); Sweden (Lindquist et al, 1978); the U.S.A. (Blaser et al, 1979); South Africa (Bokkenheuser et al, 1979); Canada (Karmali and Fleming, 1979) and many other countries have reported the isolation of Campylobacter organisms from 5 to 14% of patients suffering from diarrhea and less than 1 % of people without symptoms. Also reports that have been

received from the tropics suggest that the infection with them is particularly common and in such areas it could as well prove to be a disease of much greater importance than it is in temperate zones (DeMol and Bosmans, 1978).

In addition other Campylobacter species occasionally cause disease in humans, systemic campylobacteriosis, the most common manifestation of it is bacteremia without localized infection (Guerrant et al, 1978). However, campylobacteriosis during pregnancy and perinatal period still receive little attention in recent literature in spite of a reported case of intrauterine death associated with maternal campylobacteriosis (Gribble et al, 1981).

Up to the moment, no other study has been done to determine the importance of this organism as a possible pathogenic factor in Egyptian children.

Aim of the Work

Therefore, the aim of this thesis is to determine the incidence and carrier rates of Campylobacter organisms among the Egyptian children.

REVIEW OF LITERATURE

1) Historical Background

Campylobacter species have been known to cause abortion in cattle and sheep since the initial iosla-tion of Vibrio (now Campylobacter) fetus in 1909 (Smibert, 1978).

In 1947, V.fetus was first cultured from the blood of a person (Vinzent et al, 1947) and over the next 10 years these organisms were occasionally isolated from blood, C.S.F., other body fluids, and from absesses. Most of the affected patients were elderly or were debili-tated by alcoholism, malignant diseases, diabetes mellitus, or cardiovascular diseases (Bokkenheuser, 1970).

Because V.Vetus caused systemic illness predo-minantly in compromised hosts, it was considered an opportunist. In 1957, however, Elizabeth king recog-nized that there were two groups of V.fetus isolates, each with distinct serologic and biochemical charac-teristics. She called the organisms that grow best at 42°C "related vibrios" and noted that although the organisms were isolated from blood cultures in each case, the patient had had a preceding diarrheal illness. King postulated that the related vibrios caused acute diarr-heal illness but could not be isolated from fecal specimens

because they were slow growing and fastidious (King, 1957, 1962).

In 1969, Dekeyser et al, using a selective medium succeeded in isolating related vibrios from stools of patients with diarrhea (Dekeyser et al, 1972). So, the first positive stool cultures from these organisms were reported by Butzler, Dekeyser and collaegues from Belgium (Butzler et al, 1973). Stool specimens were filtered through a 0.56 micron millipore filter and cultured in a 5% oxygen atmosphere on thioglycollate agar containing bacitracin, polymyxin, novobiocin and actidione.

Because V. fetus and related vibrios did not ferment glucose and differed fundamentally in DNA composition from vibrio species, Véron and Chatelain (1973) proposed the new genus Campylobacter. Under their schema, king's related vibrios became C. jejuni and C. coli while the opportunistic organisms became C. fetus ss. fetus (Fig. 1). Since C. jejuni and C. coli differ only slightly in phenotypic characteristics (Skirrow and Benjamin, 1980), and since C. jejuni is found more commonly in human beings, we will refer to them collectively as C. jejuni. King's related

Genus	Campylobacter				
Spacies	Fetus	jejuni	coli	fecalis	sputorum
Subspecies	fetus	venerealis	suptorum	bubulus	mucosalis

Fig. (1) The genus Campylobacter
(Data adapted from Skerman, et al, 1980)

vibrios have also been called C. fetus ss. jejuni, whereas the opportunists were termed C. fetus ss. intestinalis (Smibert, 1974) but these names are no longer approved.

In 1977, Skirrow using first a modification of Dekeyser's method and later culturing unfiltered stool specimens on blood agar containing vancomycin, polymyxin B, and trimethoprim, corroborated the Belgian finding that these organisms are a common cause of diarrhea. Since Skirrow's report, there have been many communications which support this contention (Dale, 1977; Lindquist et al, 1978). The evidence for the pathogenic role of C. fetus ss. jejuni in acute diarrheal illness

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C. jejuni : Campylobacter jejuni.

C. coli : Campylobacter coli.

C. fetus ss. fetus : Campylobacter fetus subspecies fetus.

rests primarily on its isolation in large numbers of patients with acute diarrhea and on negative isolation attemps in appropriately selected control patients without diarrhea. In the majority of reports, the differences in isolation rates are statistically significant (Ketting , 1979).

2) Taxonomy and Classifications

The previous designation of these organisms as Vibrio species was made on the basis of its morphologic similarity to Vibrio cholerae. Both organisms are thin, motile, curved Gram negative rods. However, there are major differences in biochemical, growth characteristics and in DNA base nucleotide content of the nuclei, between true vibrios and the organisms now classified as Campylobacters. Campylobacters neither ferment nor oxidize carbohydrates, are microaerophilic or strictly anaerobic and have guanine plus cytosine content in the DNA base nucleotide between 30 and 36%. True vibrios ferment selected sugars with acid production, can grow in 3% sodium chloride, are facultatively anaerobic, and have guanine plus cytosine content of 40 to 50% in its DNA base nucleotide (Sebald and Véron, 1963).

In the light of these distinct differences, Véron and Chatelain (1973) suggested that those organisms known as Vibrio fetus species and other similar vibrios should be reclassified as belonging to a new genus; i.e. Campylobacter. The name is derived from the Greek terms "campylo" which means curved and "bacter" which means rod. Although the designation of

the genus Campylobacter is now widely accepted for this group of bacteria, there is still a considerable confusion and controversy about the nomenclature and classification of strains within the genus. The currently accepted species classification of Campylobacter from Bergey's Manual of Determinative Bacteriology (Smibert, 1974) is listed in Table (1) along with synonyms used in the past (Jones, 1931; King, 1957; Florent, 1959; Véron and Chatelain, 1973). In this schema, there are three species within the genus Campylobacter (C. fetus, C. sputorum and C. fecalis) and also three subspecies within the species Campylobacter fetus (ss. fetus, ss. intestinalis, ss. jejuni). The assignment of species and subspecies depends on growth and biochemical characteristics as outlined by Smibert (1974, 1978).
Some European authers continue to prefer the nomen clature of Véron and Chatelain (1973) to that of Smibert (1974).

Other multiple classification schemata which include analysis of somatic and flegellar antigens have been proposed (Smibert, 1978) The complete antigenic characterization of C. fetus has not been accomplished . The current classification of strains based on growth and biochemical strain differences is preferable (Retting, 1979).