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Detection of Adenovirus 40/41 among Children with Diarrhea and some Hematologic Disorders

A Thesis

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1. 1 Introduction.

Acute Diarrheal diseases (ADD) account for one in nine child deaths worldwide more than acquired immune deficiency syndrome (AIDS), malaria, and measles combined (Anteneh *et al*., 2017). It is the major cause after pneumonia in children and according to the World Health Organization (WHO), 2 million cases of diarrhea were seen in children (Celik *et al*., 2015). Acute diarrheal disease is still associated with high morbidity, especially among children as well as elderly (Barker *et al*., 2018). Acute diarrheal disease has a major impact on global health due to the high cost of hospitalizations and outpatient visits associated with diarrhea in developed countries (Wilhelmi *et al*., 2003).

The complexity of diarrhea and the increasing cost of treatment puts additional burden on the health sector. To demonstrate the economic burden of diarrhea to policy makers using the WHO protocol for cost data collection and estimation (Aikins *et al*., 2010).

Many different agents including viruses, bacteria, and parasites can cause acute gastroenteritis (Magalhães *et al*., 2007). Among the major causative viral agents of acute gastroenteritis are rotaviruses, human norovirus, human adenovirus (HAdV) and caliciviruses (Walker *et al*., 2013). Enteric human adenoviruses are considered to be the third leading cause of non-bacterial diarrhea among children, in addition to being one of the primary agents responsible for pediatric intussusception caused by viral agents (Minney-Smith *et al*., 2014).

Human adenoviruses are non-enveloped particles with icosahedral symmetry, which have a linear double-stranded DNA. These viruses belong to *Mastadenovirus* genus of *Adenoviridae* family. They have been characterized and classified into species and serotypes, and correlated with the genotypes

according to the characteristics of their penton, hexon, and fiber proteins (Berk, 2013).

Human adenoviruses 40/41 are spread predominantly by the fecal-oral route (Asilova, 2012). After an incubation period of 8 up to 10 days, periodic diarrhea occurs, with low grade fever, vomiting, abdominal pains, and dehydration (González *et al*., 2011).

Viral infections are important causes of morbidity and mortality for patients with a hematological malignancy. However, fatal adenovirus infections have been reported in patients with B-cell lymphoma, multiple myeloma (Kaur *et al*., 2002; Fianchi *et al.*, 2003). As well as children with acute myeloid leukemia (AML) are at high risk of life-threatening bacterial and fungal infection. Furthermore, little is known about the frequency or severity of adenovirus infection in this population (Renzi *et al*., 2018). Death secondary to adenovirus disease has been reported to range from 30% to 50% (Lion *et al*., 2003).

Several studies have been undertaken to elucidate the role of enteric adenoviruses among children in different Iraqi places such as Sulaimani (Jaff *et al*., 2015), Baghdad (Hussan, 2013), Duhok (Badry *et al*., 2014) and Al-Najaf city (Al-Sadawi *et al*., 2017), they found that 3%, 6 %, 13.21% and 34.4% respectively. The common disease reported all over Iraq in December 2017 is acute diarrhea majoring about 17692 (WHO, 2017).

1.2 Aims of the study.

The current study aims to.

1. Detection of human adenovirus 40/41infections in children with diarrhea and some hematologic disorder by use enzyme linked immunosorbent assay and immunochromatography.
2. To assessing prevalence rate of human adenovirus 40/41infections among selected sample children with diarrhea in Al-Batool Teaching Hospital for Maternity and Children, Center of Hematology in Baqubah city.
3. To assessing prevalence rate of human adenovirus 40/41infections infection among selected sample children with diarrhea in Central Teaching Hospital of Pediatric in Baghdad city.
4. To study the relationship between viral infection and different parameters such as gender, age, level of mother education, water source and clinical signs like fever, vomiting, abdominal pain, dehydration and weight loos.