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Role of Leptin in Febrile Urinary Tract Infection

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Abstract

Background: Leptin is a hormone that plays an important role in human health against infections. Some studies have reported that leptin acts as a reactant phase marker in some infectious diseases. The role of leptin in febrile urinary tract infection (UTI) has not been adequately evaluated.
Objectives: This study was conducted to determine the role of serum leptin in febrile UTI in children.
Methods: Thirty-nine febrile UTI patients were compared with 40 healthy children for the serum leptin level. Serum leptin was measured by the enzyme-linked immunosorbent assay method. The results were compared between the groups.
Results: Median (IQR) of serum leptin in the case and control groups was 2 ng/mL and 0.6 ng/mL, respectively. A significant difference was observed between the groups in the serum leptin level (P = 0.001). No significant difference was observed between cystitis and acute pyelonephritis patients in the serum leptin level. The correlation analysis showed no significant association between the serum leptin level and acute-phase reactant markers such as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) (r = -0.13 and P = 0.41; r = -0.15 and P = 0.36, respectively).
Conclusions: The present study showed that although serum leptin increases in febrile UTI, this increase is not correlated with C-reactive protein and erythrocyte sedimentation rate. Also, this marker cannot discriminate between cystitis and acute pyelonephritis.

Keywords: Leptin, Urinary Tract Infection, Children

1. Background

Leptin is a hormone mainly produced and secreted by white adipose tissue and considered as an adipokine (1). This hormone was first identified in 1994 and is a 16KDa protein with 167 amino acids produced by the obese gene. This gene is located on chromosome 7 in humans (2, 3). Leptin, in addition to adipose tissue, is produced in low amounts by other organs of the body, such as pair, stomach, pancreas, ovaries, bone marrow, and lymphoid tissue (1, 2). Although the most important role of leptin is to regulate food consumption besides energy expenditure, in recent years, the role of this hormone has been declared in immune functions and inflammatory processes (4-6). It has been reported that leptin is an inflammatory marker that increases in bacterial infections such as respiratory diseases, Urinary Tract Infection (UTI), and sepsis (7-10). According to Maruna et al. (8), there is a significant association between leptin and CRP. These authors pointed to the role of serum leptin in regulating the synthesis of acute-phase proteins during the systemic response. Regarding the above-mentioned issues, these questions were posed to us: How does leptin change in febrile UTI? Can serum leptin be used as an inflammatory marker in children with febrile UTI?

Urinary tract infection is a common disease in infants and children (11). The incidence of the disease among girls and boys up to six years of age is 3% - 7% and 1% - 2%, respectively. About 12% - 30% of these children have recurrent UTI (12). Urinary tract infections are caused by the invasion of pathogenic organisms, especially bacterial agents, to the urinary tract. The most common cause of UTI is *Escherichia coli*. This organism is responsible for 85% - 90% of UTIs (12, 13). The two most common forms of urinary infection are cystitis and acute pyelonephritis (11, 13). Acute pyelonephritis is a severe form of the disease, and its delayed management may result in severe complications such as renal scarring (13-15). Due to the late preparation of urine culture results and the unavailability of DMSA renal scanning (16) in most centers, the decision to initiate antibiotic therapy in children with UTIs is usually based on clinical symptoms