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## Growth in Patients with Vesicoureteral Reflux

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Vesicoureteral reflux (VUR) is an important cause of proteinuria, hypertension, and end-stage renal disease. Isolated VUR and its complications might impair physical growth, which are discussed in this editorial.

**Keywords:** Growth; Vesicoureteral Reflux; Reflux Nephropathy; Child.

**Running Title:** Growth in VUR

Primary vesicoureteral reflux (VUR), the most common urological abnormality in infants and young children, has been reported in 30%-50% of patients with symptomatic urinary tract infection [1]. Studies have suggested a relationship between VUR, renal scarring, and physical growth [2,3].

Tubulointerstitial dysfunction of reflux nephropathy (RNP) in association with increased catabolic demands in urinary tract infection is the main cause of decreased weight and length gain in children with VUR. In addition, chronic kidney disease secondary to RNP might impair the potential body growth in these patients [2-5].

The relationship between VUR and growth retardation is discussed in different sections in this editorial, including:

**VUR and renal scarring:** Significant growth retardation and catch-up growth failure might occur in children with VUR and renal scarring [4]. In fact, patients with bilateral VUR and renal parenchymal damage might have a lower weight for height index (WHI), height standard deviation score (HZ score), and weight to height ratio (W/H) compared to those with no renal scarring, which indicates partial insensitivity to growth hormone secretion characterized by high growth hormone and low IGF-1 levels in these patients [3].

In contrast, patients with unilateral VUR ± renal scarring or bilateral VUR without renal damage have a similar or even higher height compared to healthy controls [4]. However, early diagnosis and management of VUR might obviate the adverse effect of renal parenchymal damage and high grade VUR on the height and HZ score [2].

**VUR and recovery:** Increased body growth has been reported in children with VUR and normal renal function after medical and/or surgical treatment [4,6]. In addition to annual and final HZ score, height and weight might improve significantly in patients with recovered VUR [1,2]. HZ improvement is significantly lower in non-recovered VUR patients than in patients undergoing surgery [1].

Normal ranges of height and weight gain are often observed after reconstructive anti-reflux surgery in children [7]. They have a significant higher final HZ than those treated with antibiotic prophylaxis without final recovery [2]. In addition, resumed or increased renal growth has been reported in children after appropriate anti-reflux surgical repair [8].

**VUR and prophylaxis:** Early recognition of VUR and systemic antibiotic prophylaxis can maintain renal function and improve the body growth score regardless of the severity and laterality of VUR or renal scar [9,10].

Prevention of urinary tract infection by early antibacterial prophylaxis might enhance normal body growth in children with a prenatally detected VUR [2,3]. There is no significant difference in the final or annual HZ score between surgical treatment and antibiotic prophylaxis in the recovered group. Despite a significant increase in the WHI, a decreased final HZ has been reported in children with non-recovered VUR receiving prophylactic antibiotic treatment [1].

However, no significant correlation has been found between the potential physical growth and renal parenchymal damage, recurrent UTI, surgical treatment, antibiotic prophylaxis, patient age, and severity or laterality of VUR in some other studies [3,10].

In conclusion, early diagnosis and treatment of VUR is important to prevent the adverse effects of VUR and renal damage on the final height growth in children [2].

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### Conflict of Interest

There is no conflict of interest in this article as the editor declared.

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