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Chronic Kidney Disease in Children: Diagnose and Treatment

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Abstract

Pediatric nephrologists are medical professionals who specialize in diagnosing and treating children with diseases and conditions of the kidneys. These professionals are highly trained to recognize and treat a wide range of kidney-related illnesses, including Alport syndrome, acute kidney failure, and blood in urine. Through their expertise, pediatric nephrologists can provide comprehensive care to help children suffering from these conditions to get well and lead a more normal life.

Keywords: Chronic kidney disease • Urine • Children

Introduction

A condition associated with permanent kidney damage known as chronic kidney disease (CKD) can advance to end-stage renal disease (ESRD). Worldwide, CKD is a significant public health issue, and much adult epidemiological research has been conducted. On the other hand, nothing is known regarding the epidemiology of CKD in children. ESRD is a terrible condition that is linked to high mortality and cardiovascular morbidity. Particular issues, like stunted growth and psychosocial adjustment in children, have a negative impact on quality of life. For the purpose of making an accurate and timely diagnosis, identifying reversible or preventable causes of progression, predicting prognosis, and supporting patient counselling, a better understanding of the epidemiology of CKD in children is crucial [1].

Description

Chronic kidney disease (CKD) and its causes

CKD in children is substantially different from CKD in adults. Since 1994, information on the early stages of CKD in children has been gathered in the United States by the NAPRTCS registry. The NAPRTCS Registry, which covers more than 7,000 children under the age of 21, gathers data voluntarily from paediatric nephrology facilities and serves as a significant repository for knowledge about the causes of CKD in young people [2]. Congenital causes, such as congenital abnormalities of the kidney and urinary tract (CAKUT) (48%) and hereditary nephropathies (10%), were the most prevalent in a recent NAPRTCS report. 14% of cases were due to glomerulonephritis. With age, the causes' distribution changed. The most common aetiology in children older than 12 years of age was glomerulonephritis, whereas CAKUT predominated in younger individuals.

The main cause of glomerular disease, focal segmental glomerulosclerosis, is three times more prevalent in blacks than in whites (19 vs. 6%), and is particularly prevalent in black teenagers (35%). The causes of CKD vary by race. The Italian and Belgian registries have revealed a reasonably comparable distribution of CKD causes across Europe. The proportions of CAKUT (58–59%), hereditary nephropathy (15–19%), and glomerulonephritis (5-7%) were different from those in the NAPRTCS database, probably as a result of the different racial distribution.

Early kidney injury

While CKD monitoring and screening programmes for adults, either population-based or targeted at-risk populations, have become crucial components of CKD prevention strategies across the globe, the value of such initiatives for kids is considerably more debatable. As opposed to the urine albumin/creatinine ratio or the creatinine-based estimation of predicted GFR that is advised for adults, tests utilised for CKD screening in children are typically restricted to urinary dipstick protein. However, there is a lot of variance in the techniques and strategies employed by various nations, and the results have low reproducibility [3].

Numerous Asian nations, including Japan, Taiwan, and Korea, have had well-established mass screening programmes to identify CKD in children for many years. While urine screening dipsticks have been regularly used in the United States on healthy youngsters for decades, screening programmes have not been adopted in Europe. The American Academy of Pediatrics advised screening urine in two populations in 2000: young children and teenagers [4]. This approach is no longer advised because the policy was amended in 2007. There has been a decline in the incidence of ESRD in Japan and Taiwan, but there is little proof that early kidney injury detection in children can result in effective therapies to slow the development of CKD.

Diagnose and treatment

The presence of kidney impairment, either structural or functional, or a fall in glomerular filtration rate (GFR) below 60 mL/min/1.73 m2 of body surface area for more than three months are both indicators of CKD, according to the KDIGO guidelines. As a result, renal dysfunction is defined by the term CKD as a continuum rather than as a distinct alteration in renal function, whether in children or adults. This makes it very challenging to examine the epidemiology of CKD. Furthermore, because CKD is frequently clinically silent, particularly in earlier stages, epidemiologic data on CKD may understate its true incidence and prevalence. This is partly due to the past absence of a standard definition of CKD and a clear scale for grading its severity.

Childhood CKD registries are typically constrained by being limited to small reference populations as well. Despite these drawbacks, it is estimated that during stages 3-5 of the disease, the paediatric incidence of CKD in Europe is between 11 and 12 per million of the age-related population (pmarp), whereas the prevalence is between 55 and 60 pmarp. Similar numbers are noted in population-based registries of other western nations, however the bulk of them lack exact information on the incidence and prevalence of pre-terminal CKD. Globally, the median incidence of RRT in children under the age of 20 is reported to be 9 pmarp, whereas the prevalence is 65 pmarp. Additionally, greater incidence and prevalence numbers have been recorded for the USA, perhaps as a result of RRT being initiated earlier and at higher GFR levels than

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in other wealthy nations. In any case, statistics from epidemiological studies in adults show clearly that ESRD is only the 'tip of the iceberg' of CKD and that there may be up to 50 times as many people with earlier stages of the illness as there are ESRD patients [5].

The primary factors that lead to the development of CKD in children are vastly different from those that trigger the disease in adults. As it turns out, CAKUT, steroid-resistant nephrotic syndrome (SRNS), chronic glomerulonephritis (like lupus nephritis, Alport syndrome), and renal ciliopathies account for approximately 49.1, 10.4, 8.1, and 5.3% of cases, respectively, and, when taken together, account for more than 70% of all paediatric CKD cases. Children's thrombotic microangiopathies, including atypical hemolytic uraemic syndrome, nephrolithiasis/nephrocalcinosis, Wilms tumour, viral and interstitial illnesses, and other conditions are less frequent causes of CKD. Although anatomical factors (such as renal hypoplasia or posterior urethral valves) unquestionably predominate in younger individuals, glomerulonephritis incidence rises in patients beyond the age of 12 years old.

Conclusion

As the number of preterm infants rises, minor decreases in nephron numbers that are observed in low-birth weight and tiny for gestational age newborns are now being recognised as significant risk factors for CKD and will pose a significant challenge for nephrologists. These issues, along with the skyrocketing prevalence of paediatric obesity, are most likely going to drastically alter the relative distribution of CKD causes.

Acknowledgement

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Conflict of Interest

There is no conflict of interest by author.

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