



THE CHILDREN'S MEDICAL CENTER OF DAYTON

Pediatric Clips

Proteinuria — Leonardo Canessa, MD

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Pediatric Clips from The Children's Medical Center are quick reviews of common pediatric conditions.

The Children's Medical Center is the region's pediatric referral center for a 20-county area. As the only facility in the region with a full-time commitment to pediatrics, Children's offers a wide range of services in general pediatrics as well as in 35 subspecialty areas for infants, children and teens. We welcome your inquiries about services available — call 937-641-3666 or e-mail marketing@childrensdayton.org.



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CASE: 15-YEAR-OLD WITH PROTEIN IN URINE

A 15 year-old girl had a physical for tennis and was found to have protein in the urine. The urine was repeated and persisted with protein four times higher than normal. No first-morning urine has been tested. She had a renal ultrasound and blood tests. She has otherwise been doing well and feeling fine. She has had no edema or arthritis. She has occasionally had pain in the thighs with exercise and maybe some asthenia. She had a bladder infection once at age 9 years to 10 years with dysuria.

Five years ago, had asthma and was treated with allergy shots and is on Desloratadine in the fall for hay fever. Had menarche at 12 years and has regular periods. She had a 24-hour urine collection on a day that she was at home, except for an hour when

she had tennis practice and had 900 mg of protein.

Her prenatal history and ultrasounds were normal. She is very active and healthy. She voids three times a day and urine is a golden color. She has a bowel movement every other day. Her diet is normal. She may have a can of pop in the afternoon. She had normal development; immunizations are up to date.

Mother is healthy with history of UTI as an adult with no evidence of stones, gout, hypertension or diabetes. The maternal grandfather had medullary sponge kidney disease with no stones and is 62 years of age. A maternal uncle 34 years of age has renal stones and gout. The father is 41 years of age. He has history of stomach ulcers and occasionally has protein in the urine with no follow-up.

There is a 21-year-old brother who is healthy.

Her weight is at the 50th percentile. Her height is between the 75th and 90th percentiles. Her blood pressure on the right arm was 96/60. Her head was normal with mild acne. Her eyes were normal with normal fundoscopic examination, good pupils response to light and with no cataracts. Ears, nose and throat were normal. Her neck was supple. Heart was regular and rhythmic with no murmur. Her chest was symmetric and lungs were clear to auscultation. Her abdomen was soft with positive bowel sounds, no masses. Her extremities showed no edema. Her CNS was normal. Her genitalia were those of a female, Tanner IV, adult.

EVALUATION/RECOMMENDATIONS

The diagnosis is proteinuria, to rule out orthostasis and to rule out glomerulonephritis. Fix proteinuria implies a chronic renal disease.

Her sodium was 139, potassium 4.1, bicarbonate 31.3, BUN 11, creatinine 0.8. Her hemoglobin is 13.7, hematocrit 38.9, and 323,000 platelets. The urine culture is negative. Her urinalysis showed a specific gravity of 1.017, pH 7, and negative blood. She had 100 protein by dipstick and 50 by sulfosalicylic acid, 0 to 4 WBCs, and 0 to 3 RBCs per high-powered field.

These laboratories are benign and support a normal renal function. The mildly elevated

bicarbonate could be associated with poor fluid intake. We requested a 24-hour urine for orthostasis to be done on a day with no physical activity to avoid proteinuria associated with exercise.

The urine collection, orthostatic, had in the first container (recumbent urine / overnight urine) a volume of 580 cc over 10.37 hours. The amount of protein excreted was 44.7 mg per total volume or 2.7 mg/m² per hour. The active container or #2 had a volume of 21 cc over two hours with a protein excretion of 29.3 mg per total volume or 9.2 mg/m² per hour which implies

mild proteinuria (normal up to 4 mg/m² per hour). Container #3 or the rest of the day had a volume of 1,070 cc over 11.63 hours. It had a protein excretion of 231.1 mg per total volume or 12.5 mg/m² per hour, mild to moderate range of proteinuria.

The total amount of protein excreted for the 24 hours was 305.1 mg/dl (normal for an adult £ 150 mg / day). The volume was adequate at 1,671 cc. The creatinine excreted was 22.3 mg/kg per day (normal 15 – 25 mg / kg / day). The creatinine clearance was calculated at 114.1 cc per minute per 1.73 m².

Continued on the reverse side.

Continued from the front.

Patients with orthostatic proteinuria, have a good prognosis. It is a benign proteinuria. Proteinuria can be seen as evidence of scarring in the kidneys, associated with UTI or vascular accidents; is seen too after intense exercise or when febrile. This patient fits well the profile of being an adolescent female, usually tall and thin. There is no higher incidence of kidney diseases. Patients with orthostasis have been followed for up to 40 years. In males, it has been recently observed that after 30 years some will have an increased incidence of coronary artery disease. We do not know if that will be true for females.

In this case, the first urine collection was done while exercising and that explains the initial proteinuria. It is important to obtain the urine collection in three containers for orthostasis, as an overnight urine collection or at a minimum as three first-morning urine voids to rule this condition out.

This urine collection confirms the diagnosis of orthostatic proteinuria. These patients should be followed with a urinalysis every six to 12 months. They should take the first morning urine obtained at bedside to be analyzed for protein. Urine should be obtained at the evaluation in the clinic to look for the presence of formed elements, blood, etc.

If the first morning urine continues to have up to 1+ protein, the patient has orthostasis (**dipstick can give a false positive reading up to 1 + with specific gravity of more than 1.012**). If at any time urine protein is 2+ or more in a first morning specimen or if there is hematuria or elevated blood pressure, the patient should be reevaluated.

This patient has a normal renal function and benign proteinuria. Her normal ultrasound with the history of UTI and the urine collection do not suggest renal scarring (should have had fix proteinuria). The diagnosis is orthostatic or postural proteinuria with a normal creatinine clearance.

Featured specialist



Leonardo Canessa, MD, is director of nephrology at The Children's Medical Center in

Dayton. Dr. Canessa received his medical degree from San Marcos University, Peru, and completed his pediatric nephrology fellow-

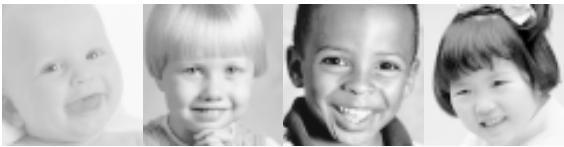
ship at Georgetown University Hospital. He is assistant professor of pediatrics at Wright State University School of Medicine.

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The department of nephrology at Children's provides comprehensive diagnostic and treatment services for the entire range of disorders of the kidney, urinary tract and hypertension. Inpatient and outpatient consultations are available for patients with electrolyte acid base and blood pressure disorders. Consultation for

calcium and phosphorus disorders and blood pressure disorders are also provided. The department offers specialized procedures for renal replacement therapy including hemodialysis, peritoneal dialysis and hemofiltration/hemodia-filtration (CAVH/CVVH) for acute inpatients. The department works closely with urologic and pediatric surgeons to provide comprehensive management of patients through a combined renal-urologic clinic.



For further information,
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