"Milky" urine in a woman with chyluria of unknown etiology

"Milky urine" is a very rare condition observed in different situations. We describe a patient with chyluria presenting as milky urine. The exact cause of chyle leakage is not known, but the symptoms are mild enough to maintain a normal life.

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Background
Cloudy or milky urine is not always a serious problem, but the cause should be identified especially if it is a regular occurrence and a medical interview provides basic clues to the diagnosis. White or cloudy urine can be caused by consumption of certain foods or drugs, but also a sign of proteinuria, pyuria, excessive mineral sediment excretion, chyluria or renal tuberculosis [3,7]. We report a case of a woman with chyluria of unknown etiology manifesting as "milky urine".

Case presentation
A 55-year old Polish woman, teacher by profession, was referred to our department for episodic proteinuria and "milky urine", appearing over the past few months. She was diagnosed to have proteinuria (1-3 g/24h) and the white urine occasionally occurred after exercise and/or in the morning hours. The phenomenon was intermittent related to both physical activity and recumbent position. Thereafter the urine was clear and no proteinuria was found. She had previously been diagnosed with temporary proteinuria and a tonsillectomy was recommended due to chronic tonsillitis. Additionally she underwent symptomatic right nephrolithiasis in 1997, treated with extracorporeal shock wave lithotripsy (ESWL). Family history did not appear to contribute to the present illness. She denied any trauma, abdominal surgery, exposure to toxic inhalants or cigarette smoking.

The physical examination revealed no abnormalities. Her blood pressure was 120/70 mmHg. Laboratory results were negative. Renal and bladder ultrasonic imaging were normal. During hospitalization urine analysis revealed episodic proteinuria accompanied by leukocyturia, when the urine colour was milky (Table I). Daily proteinuria was reported as negative in her further urine sample, when the urine colour was normal. There was no nephrotic-range proteinuria, no oedema, no hypoproteinemia (serum total protein was normal-68 g/l), a nephrotic syndrome was excluded. Further investigations revealed no hyperuricosuria, hyperphosphaturia, hypercalcemia or hyperoxaluria. We decided to check if there were any lipid compounds in a 24-hour urine sample applying a low-fat and high-fat dietary regime. The high-fat dietary intake was associated with high levels of triglycerides in urine, while a low-fat dietary period led to significant reduction in triglyceride level (Table II). Her serum lipids were normal (total cholesterol concentration: 5.3 mmol/l, triglycerides concentration: 1.3 mmol/l). The presence of triglycerides, specifically chylomicrons, in a urine sample, especially after eating a high-fat diet suggested that the appearances of a "milky" urine could be related to chyluria. To determine the location of the chyle leakage or the presence of a fistula, diagnostic imaging proceedings were performed. Urography provided fine anatomic and functional detail of both kidneys and urinary tract and cystoscopy didn't reveal any abnormality. An abdominal and pelvic computed tomography showed a uterine myomature measuring up to 4 cm maximum diameter with the varicose veins of pelvis minor. CT scans also revealed abnormal left renal vein blood flow that was divided into two branches, one of them entering into an inferior vena cava through the space between aorta and vertebral body.

Given all the above, we made a diagnosis of intermittent chyluria of unknown etiology.

Discussion
Chyluria is described as a presence of...
Chyluria can be persistent or intermittent and can manifest with turbid or milky urine (due to the presence of triglycerides) which contains also protein, fibrin clots and cellular elements, primarily lymphocytes [3]. The diagnosis of chyluria can be made by evaluating urine characteristics such as triglyceride content, non-selective proteinaemia (albumin, globulins and fibrinogen) and a negative leukocyte esterase test (an enzyme not present in lymphocytes) [1-3]. Furthermore, to exclude a non-glomerular diseases urine microscopic analysis should not exhibit oval fat bodies. A simple diagnostic method for chyluria is to restrict enteral fat intake. If the urine turns clear and the lipid component decreases, it can be a sign of the presence of chyle leak [4,10]. Abdominal imaging studies of chyle leak include: cystoscopy, intravenous urography, retrograde pyelography, lymphangiography and lymphoscintigraphy [6,8,9,12]. The management of non-parasitic, mild and intermittent chyluria involves diet manipulations focusing on the medium chain triglycerides (MCT), which enter the circulation directly through the portal system bypassing the lymphatic channels [11].

In our patient dietary maneuvers, such as intake of high-fat diet, alternated with reduced fat intake, resulted in different urine lipid concentrations. After a high-calorie, fatty food diet urine triglyceride level became excessively high, which brought us closer to a diagnosis of chyluria. The next issue to consider was the cause of the chyle leak. The patient didn’t live in or travelled to a Wuchereria-Bancroft endemic areas. Then we excluded primary kidney disease with proteinuria, hyperuricosuria, phosphaturia, hyperoxaluria and pyuria.

Cystoscopy and urography didn’t reveal any abnormalities. Abdominal and pelvic computed tomography detected no tumor or fluid collection, but CT scans showed a uterine myomatoma and venous malformations, which could have led to long-term complications such as lymphatic vessels disruption. However, to fully confirm our hypothesis, a lymphangiography would have been needed. The patient did not agree to this invasive, radiological procedure. She also refused lymphoscyntygraphy. We recommended a low-fat diet, supplemented with medium chain triglycerides (MCT) and high protein intake followed by periodic health checkups. The patient did well for the last six months, she didn’t lose weight whilst the milky urine occurred episodically with no edema, hypoproteinemia and dyslipidemia. She is periodically supervised by a nephrologist while conducting a normal life.

As a conclusion, the presence of an intermittent chyluria of unknown origin was most likely related to malformations of the lymphatic vessels as well as a lymphatic vessel disruption caused by an extracorporeal shock wave lithotripsy procedure prescribed to treat her urolithiasis.

References:
6. Kittredge R.D., Hashim S., Roholt H.B. et al.: De-


