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

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„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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Key words:
• „milky urine"
• chyluria

„Mleczny" mocz u chorej z chłonkomoczem o nieznanej etiologii

Mętny, mleczny mocz występuje rzadko i może pojawić się w przebiegu różnych stanów chorobowych. W niniejszej pracy opisano przypadek chorej z mlecznym zabarwieniem moczu spowodowanym chłonkomoczem. Dokładna przyczyna przecieku chłonki do moczu jest nieznana, jednak nieznaczne nasilenie objawów klinicznych pozwala chorej prowadzić normalne życie.

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Słowa kluczowe:
• „mleczny mocz"
• chłonkomocz

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 showed normal blood count with normal renal and liver function tests. Serological test showed C-reactive protein <3mg/L. Urinalysis showed proteinuria of 125 mg/dl and leucocyturia (75 leucocytes/ ul) periodically related to the „milky" urine. At that time the patient described the urine as being „milky'' [Fig. 1]. However, her proteinuria, when the urine was clear, was reported as negative. Bacteriologic, fungal and mycobacterial cultures 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 reveald no hyperuricosuria, hyperphosphaturia, hypercalciuria 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 myomatoma 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

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chyle in the urine, giving it a milky appearance. This state is caused by lymphourinary fistula, communicating lymphatics with the urinary tract, mediated by the obstruction of the lymphatic flow [2,12]. The etiology of chyluria may be parasitic or nonparasitic [3]. The most prevalent cause of chyluria is a lymphatic filariasis, a Wuchereria bancrofti infection, particularly present in tropical and subtropical endemic areas. Lymphangitis and lymphatic stasis lead to the dilatation of lymphatic vessels, eventually rupturing into the urinary tract [1]. Non-parasitical causes of chyluria are tumors, abscesses, fungal infections, trauma, surgery, tuberculosis, congenital malformations of the lympfatic vessels and pregnancy [2,5,7].

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 ''proteinuria (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-Bancrofti endemic areas. Then we excluded primary kidney disease with proteinuria, hyperuricosuria, phosphaturia, hyperoxaluria and pyuria.

Cystoscopy and urography didnt'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, that might be associated with chyluria. The patient denied to have ever had any trauma or surgery, except for a minimal invasive procedure for urolithiasis (ESWL) 16 years ago 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.

Fig.1
Urine samples from the patient. A high-fat diet made her urine milky (left) and a normal urine samples (right) after a low-fat dietary period.

Table I
Laboratory results of urine.
Wyniki badania moczu.

Day of hospitalization	Specific Gravity	pH	Protein [mg/dl]	Glucose	Ketones	Leukocytes [Leu/ µl]	Erythrocytes
2	1.015	6	125	negative	negative	75	negative
3	1.015	5	negative	negative	negative	negative	negative
5	1.020	5	30	negative	negative	75	negative
8	1.015	5	260	negative	negative	25	10
11	1.020	5	170	negative	negative	75	negative
12	1.015	5	negative	negative	negative	negative	negative
15	1.015	5	negative	negative	negative	negative	negative

Table II
Other urine tests.
Inne badania moczu.

	Low-fat diet	High-fat diet
Triglycerides [mmol/l]	0.2	1.4
Cholesterol [mmol/l]	negative	negative

References:

1. **Buck A.A.**: Filariasis. In: Strickland GT, editor. Hunters Tropical Medicine. 7th edn. Philadelphia: WB Saunders, 2002, 713.
2. **Cheng J.T., Mohan S., Nasr S.H. et al.**: Chyluria presenting as milky urine and nephrotic-range proteinuria. Kidney Int. 2006, 70, 1518.
3. **Diamond E., Schapira H.E.**: Chyluria-a review of the literature. Urology 1985, 26, 427.
4. **Gregor R.T.**: Management of chyle fistulization in association with neck dissection. Otolaryngol Head Neck Surg. 2000, 122, 434.
5. **Gulati S., Gupta N., Singh N.P. et al.**: Chyluria with proteinuria or filarial nephropathy? An enigma. Parasitol. Int. 2007, 56, 251.
6. **Kittredge R.D., Hashim S., Roholt H.B. et al.**: De-

monstration of lymphatic abnormalities in a patient with chyluria. Am. J. Roentgenol. Radium Ther. Nucl. Med. 1963, 90, 159.
7. **Koo C.G., VanLangenberg A.**: Chyluria. A clinical study. J.R. Coll. Surg. Edinb. 1969, 14, 31.
8. **Nishiyama Y., Yamamoto Y., Mori Y. et al.**: Usefulness of Tc99m human serum albumin. Clin. Nucl. Med. 1998, 23, 429.
9. **Núñez Mora C., Cárcamo Valor P., de Cabo Ripoll M. et al.**: Recurrent nonparasitic chyluria. Arch. Esp. Urol. 1998, 51, 932.
10. **Peng H.W., Chou C.F., Shiao M.S. et al.**: Urine lipids in patients with a history of filariasis. Urol. Res. 1997, 25, 217.
11. **Singh I., Dargan P., Sharma N.**: Chyluria - a clinical and diagnostic stepladder algorithm with review of literature. Indian J. Urol. 2004, 20, 79.
12. **Vera M., Molano A., Rodriguez P.**: Turbid white urine. NDT Plus 2010, 3, 45.