CHYLURIA

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Introduction

Chyluria has been known since the time of Hippocrates (460 B. C. - 377 B. C.). It is a condition when chyle, a turbid milky fluid, taken up by the lacteals from the intestine during digestion is found in the urine. Sometimes chyluria is known as galacturia or simply albiduria. Chyle consists of lymph and droplets of triglyceride fat (chylomicrons), that is, emulsified fat. Chyle has alkaline reaction and it coagulates outside the body into fibrin and serum. Via thoracic duct chyle is conveyed to the left subclavian vein to mix with blood. When chyle gets its way to urine the urine looks milky or creamy resembling lactescent serum. Biochemically the urine contains a colloidal suspension of fat in molecular form, albumin, lecithin, cholesterol, carbohydrates, fibrinogen, salts of fatty acids and soaps. Urine contains 2 to 4 percent of fat and does not exhibit fat droplets on microscopy. In chyluria urine contains mainly triglycerides, but it may contain protein resulting into nephrotic syndrome.

Pathology and Manifestation

Chyluria is the result of obstruction of thoracic duct above the level where renal lymphatics fall into it. As a result of this lymph hydrostatic pressure gets increased inside the lymphatics of the abdominal cavity, which are widely connected with the lymphatics of the kidneys. Hence, overfilling of the renal lymphatics occurs and they may rupture into some parts of the urinary tract (particularly into renal tubules). A temporary or permanent connection is established between lymphatics and urinary tract. Commonly such connections (fistulae) are formed between renal lymphatics and renal pelvis via fornix. Sometimes two or more fistulae may be formed and it is possibly due to lymphatic blockage with proximal dilatation. Leakage of lymph into the urine may take place from the pathologically changed lymphatics of kidney, ureters, urinary bladder or even urethra (penile chyluria).

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Obstruction of thoracic duct may be related with tumours, tuberculous mesenteric lymphadenitis, fibrosis, echinococcosis, malaria, aneurysm of aorta, ascariidosis, trauma and pregnancy. But in Nepal where filariasis is not a rare disease chyluria is primarily related to Bancroftian filariasis and is known as Tropical Chyluria. It is caused by *Filaria Sanguinohominis* (*Wuchereria bancrofti*). The infection is transmitted by culicine and anopheline mosquitoes. Its incubation period is 3 to 12 months. The adult worms which are 4 to 10 cm long reside in the lymphatic system for decades causing recurrent lymphangitis, fibrosis and obstruction. The female worm is viviparous and produces microfilariae of size 130 to 320 micron long. The later ones are found in the peripheral blood, in some forms, only at night, and being in the lungs during the day. The microfilariae sucked with blood by a mosquito continue their life cycle in the thoracic muscles of the insect for 10 to 35 days and reach its mouth parts usually after two weeks. Being punctured by the infected mosquito men get microfilariae which find their way to the lymphatics. Mature males and females mate. After a year of infection microfilaria appear in the peripheral blood circulation.

Manifestation of the disease depends on the adult worm load, their location and the susceptibility of the host. The adult worm in the lymphatics cause endothelial thickening, fibrin deposition, cellular infiltration containing eosinophils, histiocytes, lymphocytes and giant cells. Inflammatory change may be followed by fibrosis and complete obstruction of the lymphatics particularly when over a period of years repetition of inflammation takes place. Death and calcification of the adult worm may exacerbate chronic inflammation and obstruction of the lymphatics resulting into chronic oedema of the infected site.

Filarial fever is seen only in the acute phase of the disease. Fever, headache, lymphadenopathy (particularly inguinal, femoral and epitrochlear) and epididymitis is mostly associated with urticarial rashes. Edema develops gradually as the lymphatic obstruction increases. Lower limbs and genitalia are often affected. Over the years pitting edema may become nonpitting and finally elephantiasis may result. Chronic genital inflammation may cause hydrocele or simply scrotal skin edema with or without ulceration. The ulcer may discharge milky fluid -- chyle (lymph weeping). It may not heal demanding surgical measure.

Chyluria is another symptom of filariasis. It may be renal, ureteral, vesical or urethral in origin, depending on the level at which the lymph varix communicates with the urinary tract. In spite of the level of the lymph varix communication intermittent (postural) or constant milky urine is the major sign. Chyluria is often associated with pyelonephritis and sometimes with cachexy.

Diagnosis

The diagnosis of filarial chyluria is suggested when the patient complains of milky urine (urine like "Chaulani") that form semicolid gel becomes like "Bhat ko Mad" on standing. On standing the urine settles into three layers: (1) a top layer of fatty material, (2) a middle pinkish layer of clot, and (3) a bottom layer of blood and debris. Biochemically

the milky urine has all elements of lymph. Albumin, fibrinogen, cholesterol, lecithin, salts of fatty acids and carbohydrates all are present in milky urine. Chylous urine may contain microfilarial, which is best found by concentration techniques.

Excretory urography and retrograde pyelography, though rarely, may be useful to detect out lympho-fornical-pelvis communication as reflux. Pyelolymphatic backflow is sometimes well marked in retrograde pyelogram.

Lymphangiograms are useful to reveal the extent of the lymphatic obstruction and to find out the site of exact localization of lympho-urinary communication. Large tortuous lymphatics in the lumbar region with poor filling of the trunks and reflux of dye into lymphatics of one or both renal pedicles are seen. This sort of preoperative information may help to make out Surgical plan.

The nonvisualization of retroperitoneal lymph nodes is significant that block the normal passage of chyle leading to lymphatic hypertension resulting into formation of abnormal and dilated collateral channels. Hence, chyle may flow towards the kidneys or urinary tract in a retrograde way. But chyluria may occur without definite blockage of the thoracic duct. Thus, thoracic duct pathology is not essential to chylous reflux, though it may play an important causative or aggravating role (Kinmonth, J.B. 1972).

Oral fats labeled with Sudan 3 or isotopic ¹³¹I will appear in the urine extracting chyle as well as indicating its level of leakage.

If microfilariae are not demonstrated in night blood films as well as in the chylous urine by concentration technique and there is great suspicion about the filarial origin of the chyluria immunologic tests are carried out. Filarial complement-fixation test and skin test are generally performed. Positive tests are suggestive of filarial etiology of chyluria, but negative tests are inconclusive as these tests are group specific. (Von Lichtenberg F, Lehman J.S. 1978).

Biospy of the lymphnodes is not advised to identify worms as they are often few and lymph node removal may worsen lymph drainage.

If chyluria is related with bladder lymphatic varix it is often located at the fundus, extremely rare at the trigonum. Cystoscopy done on a full stomach with a big milk feed may reveal the site of lymphatic fistula. If the site is ureter or renal pelvis milky fluid will be periodically discharged from the ureteral opening often from the left one. But cystoscopy is made difficult if the lymph flow is gross and there are coagulated mass, fibrin and blood clots in the bladder cavity. Still cystoscopy alone or with insertion of ureteric catheters, to have a serial collection of specimens from the two sites, is indicated for preliminary localization of the side of chyle leakage.

Differential Diagnosis

Pyuria and lipiduria are common items to be differentiated. In pyuria urine appears cloudy and smells offensive. Plenty of pus cells and bacteria are found in microscopy.

Lipiduria has fat droplets that rise to the top on centrifugation. Lipiduria may be associated with fractures, diabetes-mellitus, eclampsia as well as poisoning with arsenic, phosphorous and carbon monoxide.

Clinical Findings

Chyluria is seen from 0.5 percent to 2 percent of all patients suffering from filariasis. Mostly it is seen in patients from 20. to 40 years old. If chyluria is related with rupture of the lymphatics into the urinary tract along with the rupture of the blood vessel haematochyluria takes place. But it should be considered that there may be repeated haematuria in filariasis without chyluria but with microfilaria. In chyluria the urine may be milky white if there is no blood, but if haematuria is present the urine may be dark-brown.

The site of lymphourinary fistula is situated in about 66 percent of cases in urinary bladder. In rest of the cases it is located in renal pelvis and ureter more often in left side. Very rarely the lymphourinary fistula may open into the posterior urethra.

Formation of clots in chyluria or haematochyluria may obstruct urinary flow from renal pelvis and ureter and cause pain in lumbar region even leading into renal colics. In some cases acute urinary retention may take place.

In spite of persisting loss of fat and protein serum fat level in majority remains normal. The serum protein level is slightly lowered. Though rarely, due to permanent loss of big amount of fats and protein, the patient may lose weight progressively and become cachectic (Chebanuk N, 1963).

Treatment

Therapy of chyluria of filarial etiology is directed towards the treatment of the filariasis, removal of the obstruction and low fat diet.

Sometimes chyluria corrects itself spontaneously or to bed rest and use of abdominal binders (by wearing a tight abdominal cast), that increases the intra abdominal pressure stopping the leak of low-pressure lymphatic fluid. Chyluria of bladder origin responds on local instillation of bladder with 1 percent solution of silver nitrate or fulguration of the leaking bladder lymphatics. Renal chyluria is best left alone. Persisting Renal Chyluria may be treated with instillation of renal pelvis for three minutes with 2 to 5 percent solution of Silver Nitrate (3 to 5 ml), table tilted down to the head end, or it may need decapsulation of the kidney and freeing of renal pelvis and ureter from parapelvic and periureteral fats. An anastomosis may be formed between pararenal hilus lymphatic varix and spermatic vein (Cockett, A Goodwin, W 1962). Unfortunately it is very hard to find out the lymphatic varix. Operation-ligation of renal lymphatic may cure severe persistent chyluria (Kinmouth J.B. 1972).

Severe and persisting chyluria, not responding to any of the conservative and surgical measure and related with unilateral kidney, may be cured by nephrectomy, which

is advised only if the contra lateral kidney is intact or functions well (Aslamazov G. 1970). A cachectic patient due to heavy loss of fats and protein, if does not improve his general condition, inspite of blood and plasma transfusion and other conservative measures, may also need radical operative procedure-nephrectomy.

Drug Therapy

Diethylcarbamazine (Banocide, Banocide Forte, Carbamyl, Carbamyl Forte, Diacarb, Ditrazinum, Eofil, Eofil forte, Hetrazan etc.) is the principal and most effective antifilarial drug used throught the world today. It is active against both the microfilarial as well as the adult worms. Diethylcarbamazine is started at low dosage (3 mg/kg body weight/day) and increased gradually to reach 12mg/kg body weight/day in three divided doses after meals. Over three-four-six weeks treatment is continued. To prevent relapse 2 such courses may be repeated at three months intervals. Due to the massive lesion of the worms the patient may develop allergic symptoms which may need antihistamines for prompt relief. Carbamyl, Carbamyl Forte, Eofil, Eofil forte Diacarb etc. which contain chlorpheniramine maleate may be successfully used with less allergic complications. Allergic reactions due to foreign proteins, released from dead microfilariae, include joint pains, swellings and rashes. These reactions are seldom severe enough to warrant discontinuing the drug.

Along with the Diethylcarbamazine treatment antibiotics are indicated to control secondary infection.

Conservative medical treatment cured chyluria in only 15.3 percent of cases, instillation of renal pelvis with 2 to 5 percent sol of silvernitrate in 56 percent and freeing of renal hilus from fat stopped chyluria in 75.7 percent of cases. Recurrence of chyluria was registered in 28.1 percent of all cases (Okomoto K., Asechin S., Nagata K. 1964).

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