



Shweta Shah

@nefron1310

27 Tweets • 2022-04-18 21:29:03 UTC • [See on Twitter](#)

rattibha.com

1/ Hello #Medtwitter #NephTwitter.

Different urine colors and the pathology it signifies is amazing!

Milky white urine is one such color we dread. What does it signify? Lets read on

#ASPNOAMgroup @ASPNePh #ASPNePh #pedneph #chyluria



2/

Let's see where this comes from....

"Chyle" is milky white lymphatic fluid composed of chylomicrons, comes from Greek word *khûlos* or "juice"

Chyluria or milky urine is due to urinary-lymphatic communication

What the common causes of chyluria?

3/ All of the above

Filariasis, a parasitic disease caused by *Wuchereria bancrofti*, most commonly seen in adults and rarely reported in children

PMID:29549133.

Check out #NephMadness 2022 parasite region for description of filariasis

<https://ajkdblog.org/2022/03/01/nephmadness-2022-parasites-region/#Filariasis>

4/

Common causes of chyluria, depends on geographical location. Parasitic disease more common in Indian sub-continent and Sub-Saharan Africa

Parasitic	Non-Parasitic
<i>Wuchereria bancrofti</i> (95%)	Trauma
Taenia	Congenital lymphatic malformation e.g., lymphatic-urinary fistula Noonan, Turner, Gorham-Stout syndrome
Malaria	Post-surgery e.g. nephrectomy
Ankylostomiasis	Non-parasitic infections
	Congenital stenosis of thoracic duct
	Malignancy e.g., AML, testicular cancer

@nefron1310

5/

How do the lymphatics work?

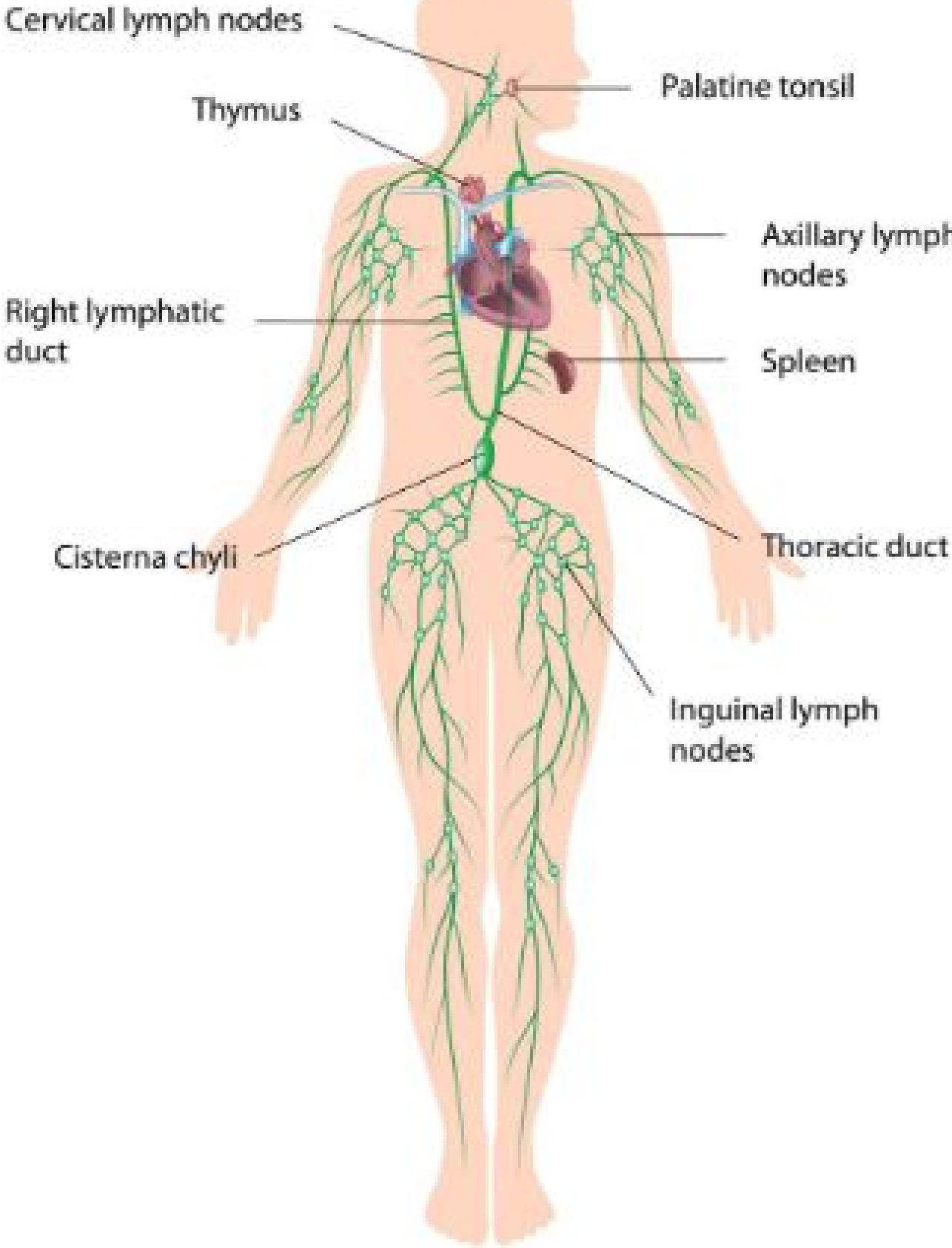
- Lymphatics reabsorb fluid and protein from tissues and extravascular spaces
- No basement membrane so high permeability for reabsorption of proteins too
- Located in deep dermis, parallel to veins, one-way flow

6/

Lymphatic system comprises of following:

Afferent lymphatics regional lymph nodes efferent lymphatics
cisterna chyli thoracic duct subclavian vein

The Lymphatic System



7/

Chyle composed of albumin+fibrin+emulsified fat

Non-parasitic chyluria is due to obstruction of normal lymphatic flow between intestines and thoracic duct □ stasis □ retrograde flow of lymph into renal pedicle lymphatic □ lymphorenal fistula formation

8/

The regurgitation theory is based on rupture of ectatic lymphatics secondary to inflammation or toxic metabolite and releasing chyle into the renal system

PMID: 32728391

<https://www.indianjurol.com/article.asp?issn=0970-1591;year=2005;volume=21;issue=1;spage=18;epage=23;aualast=Dalela>

What condition mimics lymphatic filariasis in children?

9/

Yes! Nephrotic syndrome has anasarca, proteinuria, lets see how to differentiate by urine test 🙌

This tweetorial focuses on non-parasitic causes of chyluria

Chyluria in children is rare and underreported; described mostly in case reports

PMID: 29549133

Table 1

Illustration of available case reports and comparison with present case

Author	Age (years)	Cause	Treatment received	Follow-up (months)
Stalens <i>et al</i> ²	10	Congenital pyelovesical communication	Conservative	-
Kohli <i>et al</i> ¹⁰	10	Parasitic	Conservative	1
Jung <i>et al</i> ¹¹	10	-	Conservative	10
McNeil <i>et al</i> ¹²	5	Malignancy (metanephric adenoma)	Surgery (nephrectomy)	12
Ganesh <i>et al</i> ¹³	5	-	Surgery (laparoscopic lymphorenal disconnection)	6
Present case	7	Parasitic	Conservative	12

10/

Clinical presentation in ~2/3 cases -> milky white urine

- ◆ symptoms of urinary infection
- ◆ chyle colic
- ◆ systemic symptoms weight loss, chills, edema
- ◆ Chyluria increases with fatty-meal and decreases with fat-free diet or fasting (PMID: 20872078)

<http://repo.jfn.ac.lk/med/bitstream/701/2370/1/Chyluria%20key.pdf>

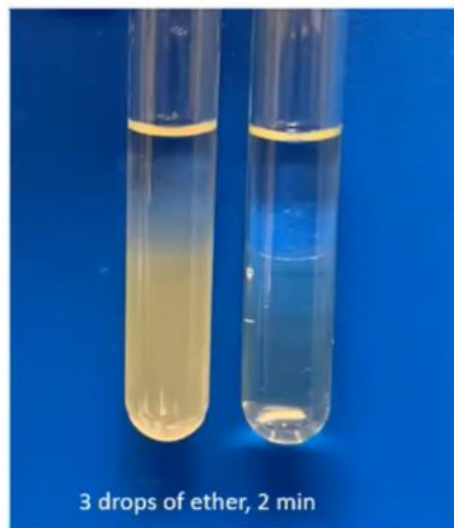
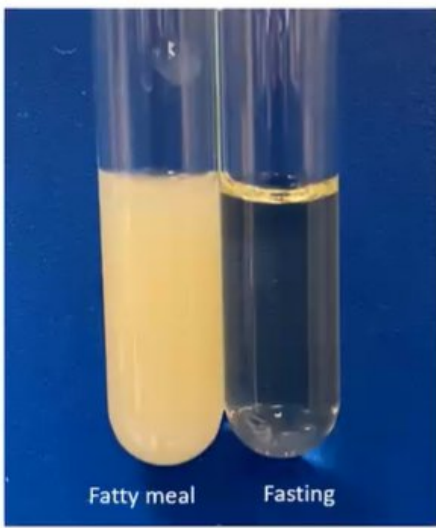
11/

Examination of post prandial urine microscopy □ separates into fat, fibrin and cellular debris

Ether (fat solvent) or chloroform, clears up urine

PMID 32728391

Image courtesy #ASPN Radiology Webinar

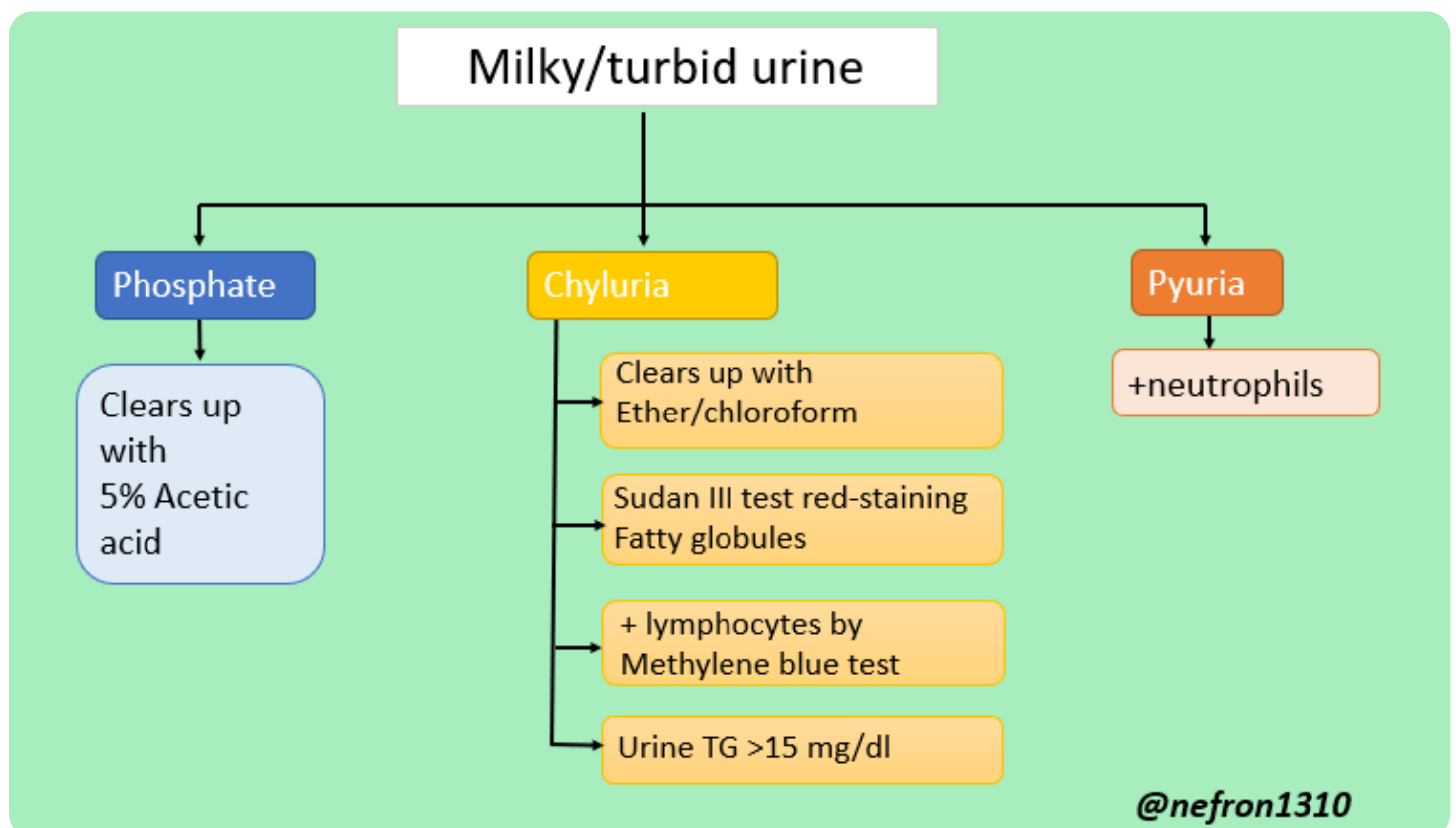


What is considered confirmatory test for chyluria on UA?

12/

🎯 Urine TG > 15 is considered diagnostic

? 🧑 How to differentiate chyluria by urine tests?



13/

Imaging 🎬

USG ▶ overall assessment of kidney and bladder

IVP ▶ not helpful as intra-renal or ureteric pressure is required to visualize the dilated para-calyceal lymphatics

CT scan ▶ identify fat within bladder and dilated lymphatics and more so after lymphangiogram



4



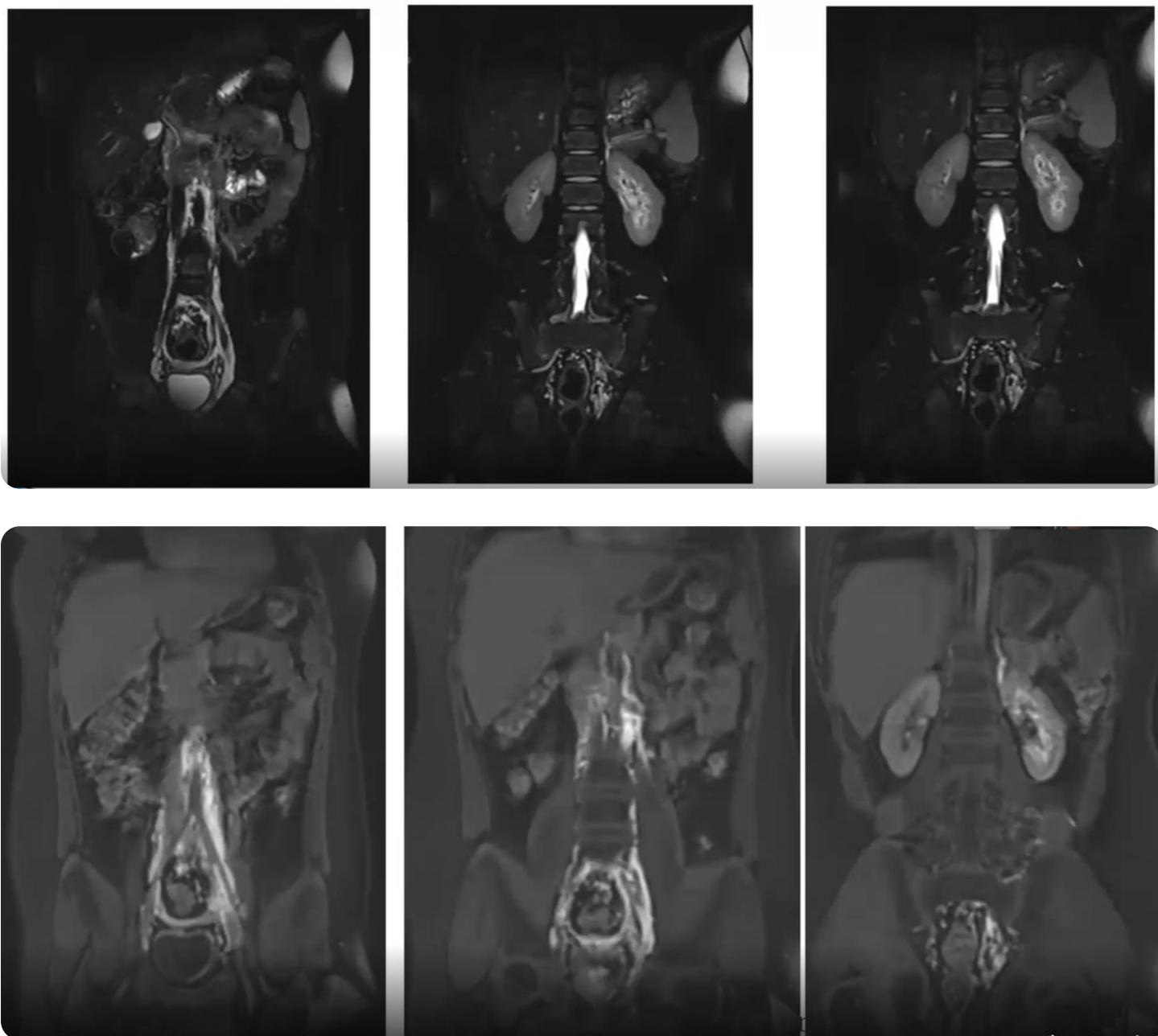
14/

✦ MR lymphangiogram is now widely described technique

✦ +/- gadolinium

✦ useful for pre-op assessment for reconstructive repairs

✦ safe, has good spatial resolution

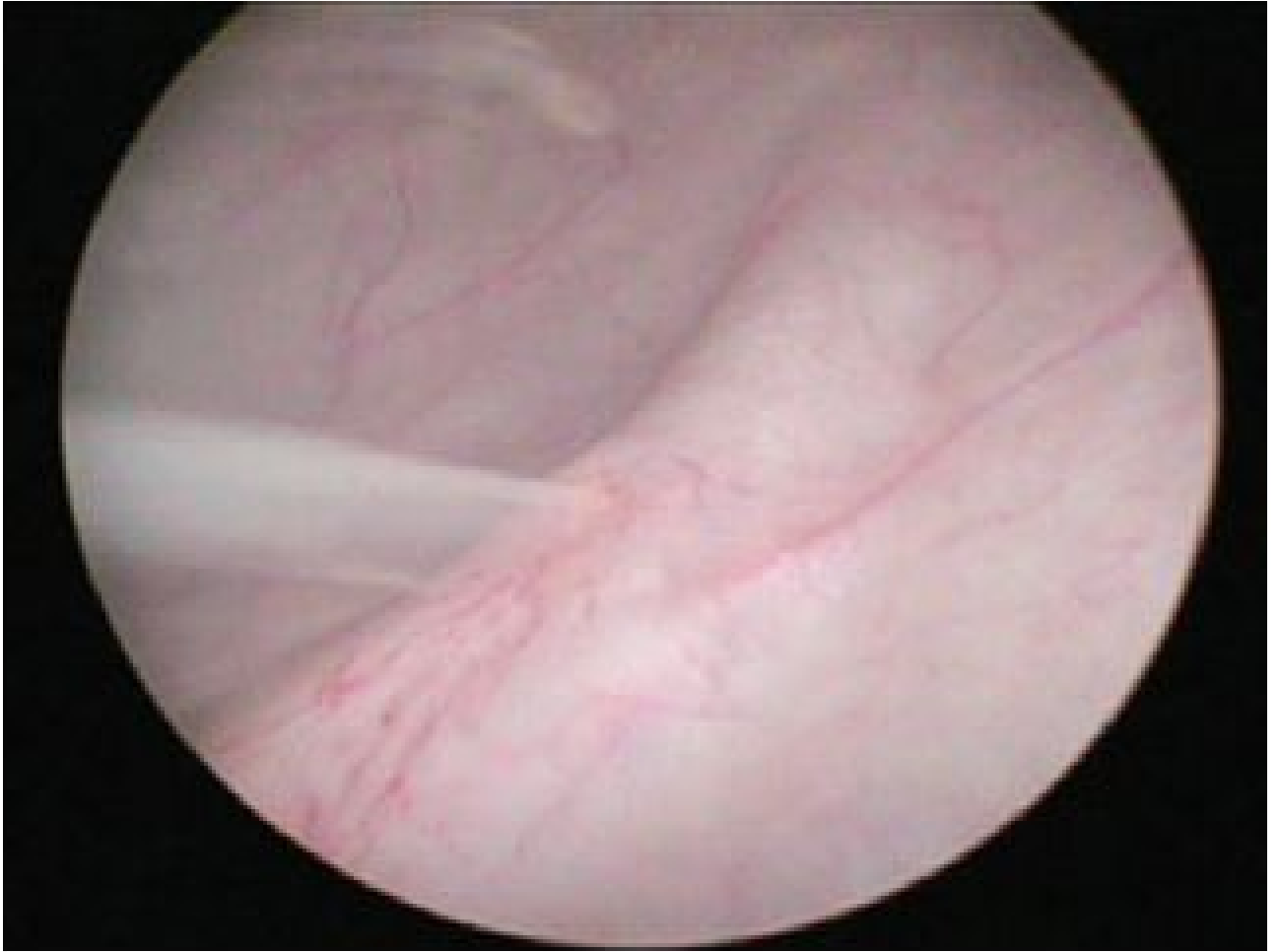


- 15/
- ✚ Retrograde pyelogram-> fistulous connection between urinary collection system and lymphatic system 📌
 - ✚ Endoscopic visualization in some cases when conservative management fails
- Cystoscopic view on milky urine effluxing left ureteral orifice 📌

PMID 19528993, 19528993



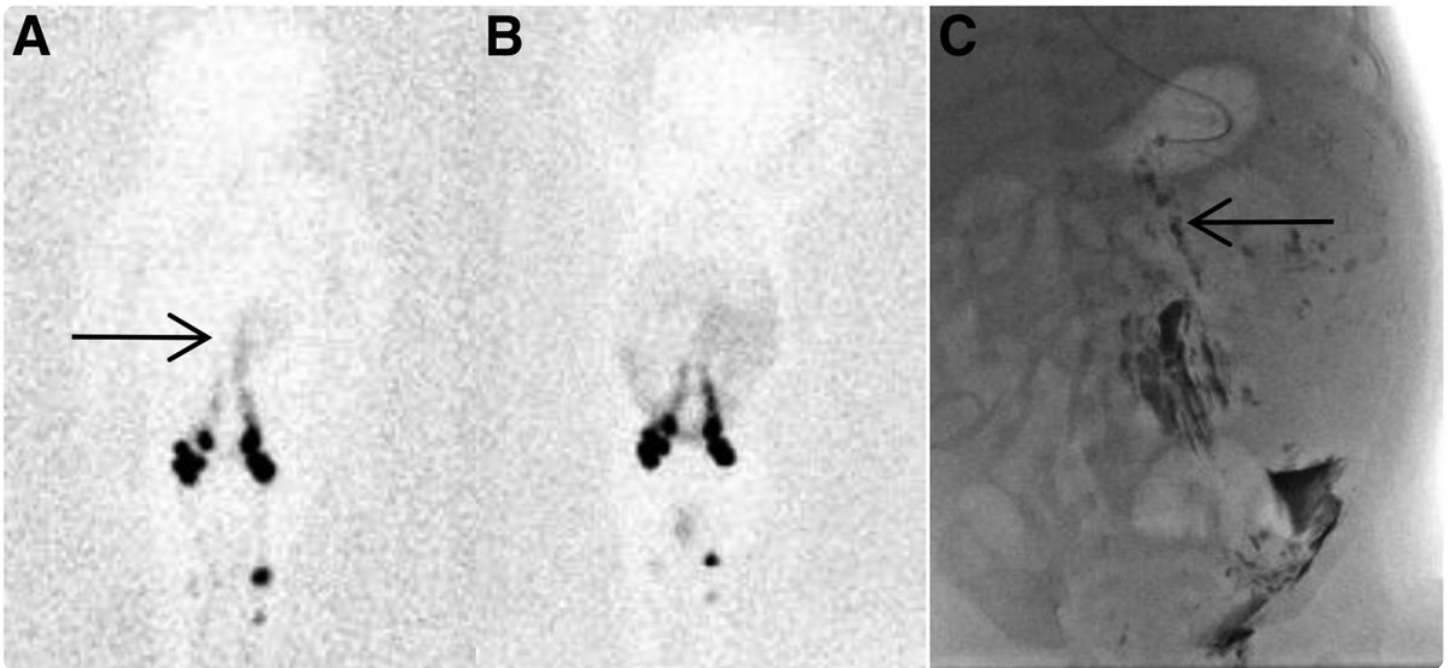
Fig. 2. Retrograde pyelogram demonstrating lymphatico-urinary communication on the right kidney. Note the extravasated lymphangiographic contrast material in the right renal calices (arrows).



16/

- ◆ Lymphangioscintigram ▶ Tc99 labeled study for road-mapping the lymphatic drainage and diagnosing fistula;
- ◆ safe and non-invasive but lacks sufficient spatial resolution, involves radiation

<https://tech.snmjournals.org/content/46/2/123>



17/

Lymphangiogram

✦ site, size and the number of fistulous communications sensitivity of 90%

✦ dysplasia of the lymphatic vessels, beading of the thoracic duct, dilated cisterna chyli

✦ invasive, technically challenging, time consuming

PMID 20675319



18/

CT lymphangiography:

- ◆ conventional lymphangiogram followed CT imaging within 60 min
- ◆ enhanced identification of lymphatic anomalies and the distribution of collateral lymphatic vessel

PMID: 29470154

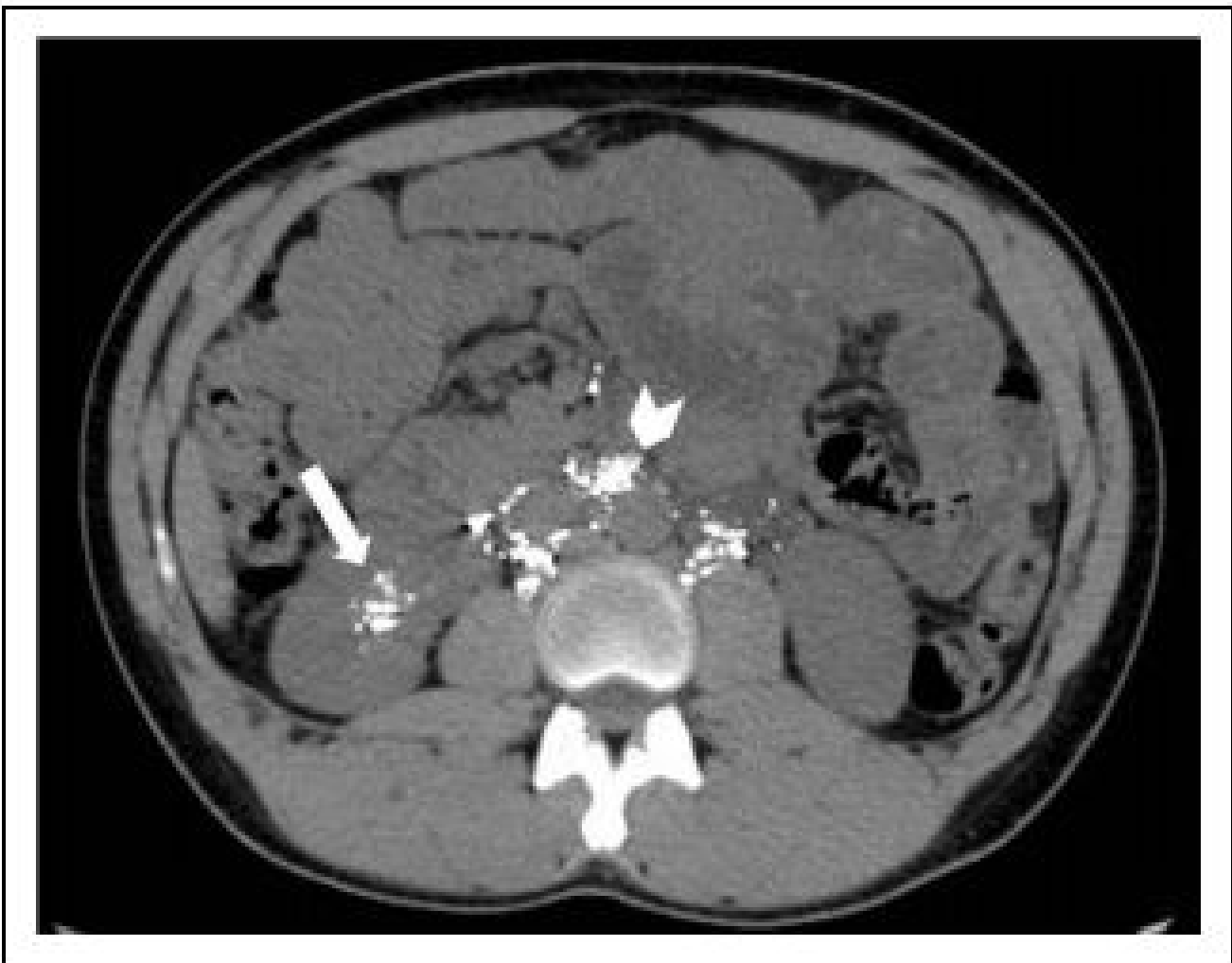


Figure 2. Axial computed tomography (CT) image taken 24 hours after lymphangiography, showing lipiodol opacifying the lymphatic channels (arrowhead), lipiodol adjacent to the right renal hilum, and lipiodol within the right kidney (arrow).

19/

Conservative approach

- 👨‍⚕️ Fat-free formula for babies/children on enteral formula
- 👨‍⚕️ High protein diet, Medium Chain Triglycerides (MCT) oil ,coconut oil as these are absorbed by portal system and not intestinal lymphatics
- 👨‍⚕️ Vitamins ADKE
- 👨‍⚕️ TPN in intractable cases

20/

Minimally invasive

- ◆ Sclerotherapy with 1% silver nitrate or 0.2% povidone iodine instillation into renal pelvis to close the fistulous connection
- ◆ Endoscopic fulguration of fistula opening

21/

◆ Chylo-lymphatic disconnection

PMID: 9439397

◆ Autotransplantation

Nephrectomy if non-functional kidney

🔥 Complications- fibrosis, adhesions, lymphocele, recurrence, prolonged recovery, wound infection, injury to blood vessel

🎯 Only if minimally invasive procedures fail

22/

🎯 Role of sirolimus in pure lymphatic malformation is shown to be beneficial

<https://jamanetwork.com/journals/jamadermatology/article-abstract/2784291>

<https://www.liebertpub.com/doi/10.1089/lrb.2017.0062>

That's all folks, hope this tweetorial helps to work up the next case of milky urine you see! #Chyluria #urinalysis #Pisseprophets

Take Home Points

- Etiology differs based on geographical location
- Some cool urine tests helps differentiate chyluria from other causes of milky urine
- MR lymphography and CT lymphangiogram are helpful diagnostic tests
- Treatment with low fat diet, minimally invasive procedure, adjuvant sirolimus. Reconstructive surgery in refractory cases

For a case-based clinical discussion with a radiology expert login to @ASPNePh website, February webinar #Membereducation #ASPNeFOAM group

Special thanks to @drM_sudha @md_abdulqader83

Until next time



These pages were created and arranged by Rattibha services (<https://www.rattibha.com>)
The contents of these pages, including all images, videos, attachments and external links published (collectively referred to as "this publication"), were created at the request of a user (s) from Twitter. Rattibha provides an automated service, without human intervention, to copy the contents of tweets from Twitter and publish them in an article style, and create PDF pages that can be printed and shared, at the request of Twitter user (s). Please note that the views and all contents in this publication are those of the author and do not necessarily represent the views of Rattibha. Rattibha assumes no responsibility for any damage or breaches of any law resulting from the contents of this publication.