



## Case Report

# A rare case: Vesicoureteral reflux in Indonesian young adult with neurogenic bladder and chronic kidney disease stage 4

Ardityo Rahmat Ardhany<sup>a,\*</sup>, Satriyo Dwi Suryantoro<sup>a</sup>, Mochammad Thaha<sup>b</sup>, Djoko Santoso<sup>a</sup>

<sup>a</sup> Department of Internal Medicine, Faculty of Medicine, Universitas Airlangga – Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

<sup>b</sup> Department of Internal Medicine, Faculty of Medicine, Universitas Airlangga – Universitas Airlangga Hospital, Surabaya, Indonesia

## ARTICLE INFO

## Keywords:

Vesicoureteral reflux  
Neurogenic bladder  
Chronic kidney disease

## ABSTRACT

**Background:** Vesicoureteral reflux (VUR) is one of the main causes of chronic kidney disease (CKD) in adolescence and young adult. It can be a congenital or an acquired anomaly and its uncommon in adult life.

**Case presentation:** A 19th years old male with neurogenic bladder, VUR grade 4, CKD stage 4, malnutrition, and short stature. Radiological examinations show a spastic neurogenic bladder, cystitis, right VUR grade 4. Abdominal ultrasonography (USG) results were bilateral severe hydronephrosis due to post-renal causes. This patient had a history of myelocele excision at the age of 1.5 years. He had recurrent urinary tract infection with CKD stage 4.

**Discussion:** The diagnosis of VUR and neurogenic bladder in CKD stage 4 is a rare case in nephrology.

**Conclusion:** Indonesian male confirms of diagnosis VUR grade 4, neurogenic bladder, and CKD stage 4.

## 1. Introduction

Vesicoureteral reflux (VUR) is defined as the retrograde flow of urine from the bladder into the ureters or renal pelvis which is a significant risk factor for pyelonephritis and renal scarring [1,2]. VUR can occur through various mechanisms such as congenital bladder dysfunction, acquired or behavioral etiology. The causes of neurogenic bladder dysfunction are neurospinal dysraphisms such as spina bifida, sacral agenesis, tethered cord syndrome, and spinal cord injury [3].

Primary VUR is common in the children population while secondary VUR could occur in adults. VUR is not well described or understood in the adult population. The incidence of VUR in children with recurrent UTI (Urinary Tract Infection) is about 30–50%. The prevalence of asymptomatic VUR in children ranges from 0.4 to 1.8%. The prevalence of VUR in infants with hydronephrosis on ultrasound is about 16.2%. The risk of siblings getting VUR with their siblings who have VUR is around 27.4%. If parents have a history of VUR, then their offspring have an incidence of VUR around 35.7%. In patients with LUTD (Lower Urinary Tract Dysfunction), the incidence of VUR increases up to 30% [1]. The prevalence of VUR in adults is not exactly known and it rarely affects young adults [4].

Recurrent urinary tract infection in children with a history of VUR

could induce renal scarring and impaired renal function up to end-stage renal disease in adult age [5,6]. VUR is one of the causes of end-stage renal disease in children, but uncommon in adult. Good maintenance therapy and monitoring of VUR in children can prevent chronic kidney disease (CKD) in adolescents and young adults. We report a case report in a young adult who suffered from VUR since he was a child but with good close monitoring, so he can survive up to 19 years old age. We report base on Surgical Case Report (SCARE) 2020 Guideline [7].

## 2. Case presentation

A 19-year-old male came with complaints of prolonged fever and recurrent urinary tract infections. The fever disappeared with the administration of antipyretic (paracetamol orally), but a few days later the fever returned. This has been repeated since the age of 1.5 years, but his mother sometimes did not take him to the hospital so that the patient did not take antibiotics routinely if he had suffered from signs and symptoms of urinary tract infection. Past medical history, there was a myelocele on the patient's spine, precisely at L-5 to S-1. Then he performed myelocele excision at the age of 1.5 years. After excision of myelocele, complaints of fever and urinary tract infection began to appear. Patients with anthropometric status, weight 32 kg, height 145

\* Corresponding author. Department of Internal Medicine, Faculty of Medicine, Universitas Airlangga – Dr. Soetomo General Academic Hospital, Jl. Mayjend Prof. Dr. Moestopo No. 6-8, Airlangga, Gubeng, Surabaya, East Java 60286, Indonesia.

E-mail address: [ardityo-r-ardhany@fk.unair.ac.id](mailto:ardityo-r-ardhany@fk.unair.ac.id) (A.R. Ardhany).

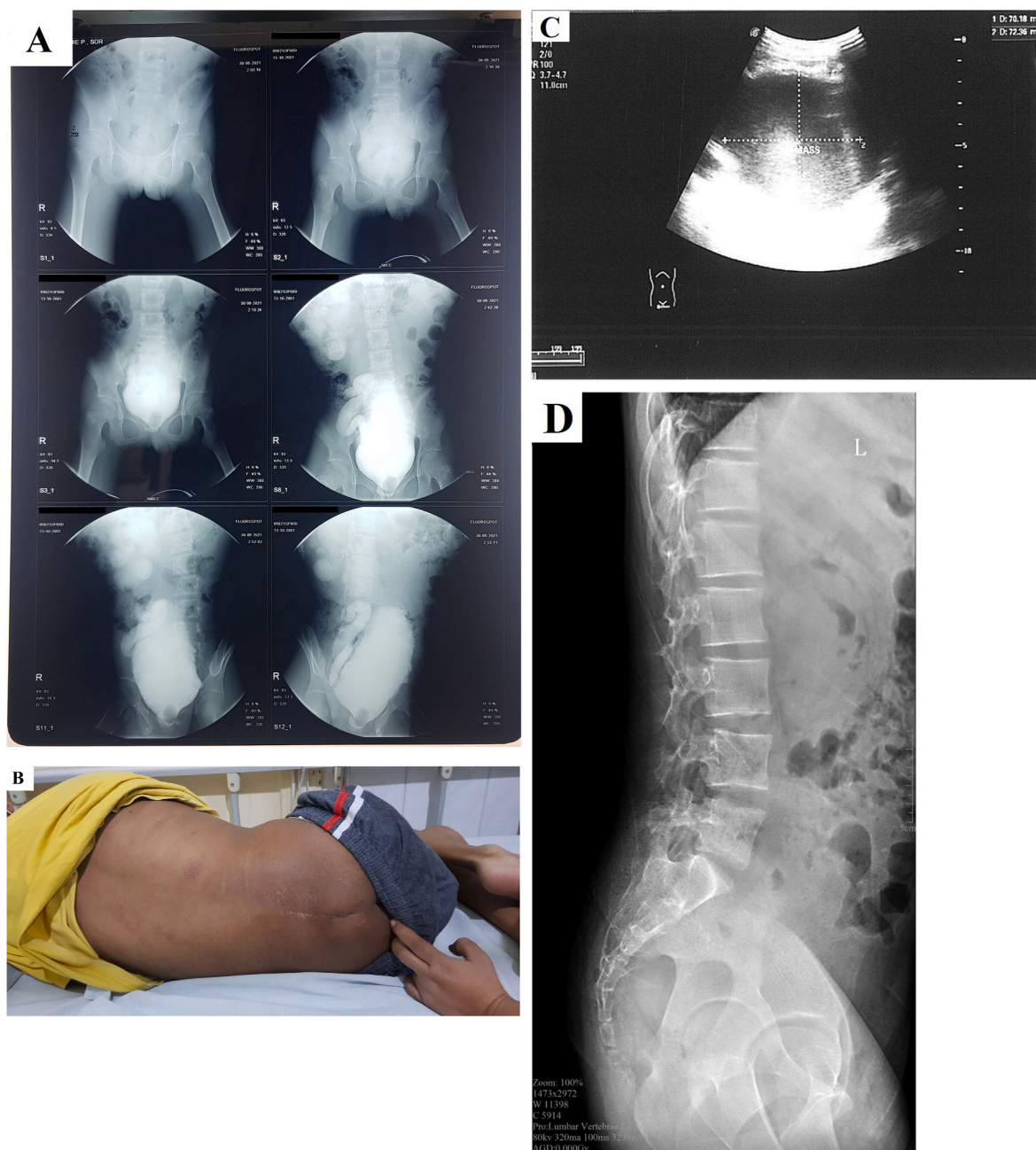
<https://doi.org/10.1016/j.amsu.2022.103267>

Received 30 December 2021; Received in revised form 7 January 2022; Accepted 13 January 2022

Available online 18 January 2022

2049-0801/© 2022 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).



**Fig. 1.** Voiding Cystourethrography: Spastic neurogenic bladder, Cystitis, vesicoureteral reflux dextra grade 4, no leakage contrast seen (A); Clinical photo of the patient (B); Abdominal ultrasonography results were bilateral severe hydronephrosis (C). Lumbosacral X-Ray (D).

cm (according to age 11 years 6 months), head circumference 55 cm, and arm circumference 25 cm with nutritional status were undernourished with short stature. Laboratory results showed Hb 11.7 mg/dL, leukocytes 12.540/mm<sup>3</sup>, platelets 355.000, urea value 115 and creatinine 2.45 with a glomerular filtration rate (GFR) of 22 ml/minutes/1.73m<sup>2</sup>. Lumbosacral x-ray examination did not show spina bifida. Abdominal ultrasonography (USG) results were bilateral severe hydronephrosis due to post-renal causes and a suspected anterosuperior bladder mass. The patient also underwent a Voiding Cystourethrography (VCUG) examination with the results of a spastic neurogenic bladder, cystitis, right VUR grade 4 (based on the international classification of reflux study), and no contrast leakage was seen. Therefore, he did catheterization to empty his bladder (clean intermittent catheterization) 3–4 times per day with the help of his mother or himself. The patient was also examined for uroflowmetry with the results, start time 0 sec, stop

time 23 minutes 51 s, flow start time 14 sec, max flow 0.7 ml/sec, max flow time 21 minutes 34 s, average flow 0.3 ml/sec. sec, void duration 23 minutes 21 s, voided volume 489 ml, and the number of flow interval 3 (Fig. 1).

### 3. Discussion

VUR is associated with an increased risk of urinary tract infections, kidney scarring, and reflux nephropathy [8,9]. The severity of VUR can be determined by looking at the results of the Cystourethrogram (VCUG) examination, with severity grades I (mild) to V (severe). In most cases, the exact cause of VUR is not known [10]. The prophylactic antibiotic is given as an effort to keep the urine sterile while waiting for a spontaneous resolution to occur [11,12]. The rationale is that antibiotics can reduce bacterial colonization in the urethral orifice to prevent the

occurrence of ascending infection that can lead to CKD or end-stage renal disease [12,13].

This patient probably suffered from recurrent urinary tract infection since he was a child because his mother said that he had suffered from recurrent fever and was repeatedly admitted to the hospital. He got antibiotic treatment every time he suffered from a urinary tract infection and clean intermittent catheterization (CIC). But unfortunately, since he was in 17 years old, he didn't perform CIC routinely. The under-treatment of recurrent urinary tract infection could be a risk factor for CKD stage 4 in this patient because of recurrent complicated pyelonephritis or renal scar. A randomized controlled trial in Italia evaluated the effectiveness of two years course of prophylactic antibiotics in 100 patients with grade I-III VUR [14].

VUR can first be present in adult life. The first presentation of VUR in adult life is rare. One of the most typical presentations is the presence of recurrent complicated pyelonephritis. Although no guidelines exist to study pyelonephritis in adult patients with pyelonephritis, in the presence of several recurrent episodes of pyelonephritis we should think of VUR as a possible cause. Reflux nephropathy could induce glomerular mediated injury and the mechanism of renal scarring probably to be chronic pyelonephritis [15–18]. In this case, the patient had a history of myelocoele that was excised when he was 1.5 years old. Myelocoele can cause neurogenic bladder in patients and recurrent urinary tract infections due to VUR. He did not take antibiotics regularly if he had fever and symptoms of urinary tract infection. The poor management of recurrent urinary tract infection in this patient suggest a chronic infectious condition or disease that can lead to malnutrition (undernourished), short stature, and CKD. The bladder dysfunction in this patient accelerates and aggravates the development of VUR when he grows up to adult. Bladder dysfunction may have an etiologic role in the development of VUR or may aggravate it [19,20].

#### 4. Conclusion

A 19th-year-old male with neurogenic bladder, VUR grade 4, CKD stage 4, undernourished and short stature. The patient survives with good close monitoring to prevent recurrent urinary tract infection and regular clean intermittent catheterization.

#### Statement of ethics

Not applicable.

#### Registration of research

- 1 Name of the registry: -
- 2 Unique identifying number or registration: -
- 3 Hyperlink to your specific registration (must be publicly accessible and will be checked): -

#### Consent

Written informed consent was obtained from the patient.

#### Guarantor

Ardityo Rahmat Ardhany.

#### Funding sources

None.

#### Provenance and peer review

Not commissioned, externally peer reviewed.

#### Author's contribution

All authors contributed toward data analysis, drafting, and revising the paper, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

#### Declaration of competing interest

Ardityo Rahmat Ardhany, Satriyo Dwi Suryantoro, Mochammad Thaha, and Djoko Santoso declare that they have no conflict of interest in this publication.

#### Acknowledgment

We thank the Universitas Airlangga Hospital, Surabaya, Indonesia, which allowed us to publish the rare case we got there.

#### References

- [1] A. Salib, B. Rudnick, A. Murphy, Vesicoureteral reflux in adults with urinary tract infections: is there a role for treatment? *Curr. Urol. Rep.* 21 (10) (2020) 35, <https://doi.org/10.1007/s11934-020-00990-3>.
- [2] C. Rollino, L. D'Urso, G. Beltrame, M. Ferro, G. Quattrocchio, F. Quarelo, [Vesicoureteral reflux in adults]. *Giornale italiano di nefrologia, organo ufficiale della Societa italiana di nefrologia* 28 (6) (2011) 599–611.
- [3] C.Q. Wu, I. Franco, Management of vesicoureteral reflux in neurogenic bladder, *Invest. Clin. Urol.* 58 (Suppl 1) (2017) S54–s8, <https://doi.org/10.4111/icu.2017.58.S1.S54>.
- [4] A.A. Friedman, M.K. Hanna, Vesicoureteral reflux and the adult, in: H.M. Wood, D. Wood (Eds.), *Transition and Lifelong Care in Congenital Urology*, Springer International Publishing, Cham, 2015, pp. 173–205.
- [5] O. Buckley, T. Geoghegan, J. O'Brien, W.C. Torreggiani, Vesicoureteric reflux in the adult, *Br. J. Radiol.* 80 (954) (2007) 392–400, <https://doi.org/10.1259/bjr/60682848>.
- [6] S. Sandal, A. Khanna, Vesicoureteral reflux, a scarred kidney, and minimal proteinuria: an unusual cause of adult secondary hypertension, *Case Rep. Med.* 2011 (2011) 913839, <https://doi.org/10.1155/2011/913839>.
- [7] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, The SCARE 2020 guideline: Updating Consensus Surgical CAse REport (SCARE) Guidelines, *Int. J. Surg.* 84 (2020) 226–230, <https://doi.org/10.1016/j.ijssu.2020.10.034>.
- [8] A.S. Blais, S. Bolduc, K. Moore, Vesicoureteral reflux: from prophylaxis to surgery, *Can. Urol. Assoc. J. de l'Assoc. des urologues du Canada* 11 (1–2Suppl1) (2017) S13–s8, <https://doi.org/10.5489/cauj.4342>.
- [9] G. Läckgren, C.S. Cooper, T. Neveus, A.J. Kirsch, Management of vesicoureteral reflux: what have we learned over the last 20 Years? *Front. Pediatr.* 9 (2021) 650326, <https://doi.org/10.3389/fped.2021.650326>.
- [10] E.H. Garin, F. Olavarria, V. Garcia Nieto, B. Valenciano, A. Campos, L. Young, Clinical significance of primary vesicoureteral reflux and urinary antibiotic prophylaxis after acute pyelonephritis: a multicenter, randomized, controlled study, *Pediatrics* 117 (3) (2006) 626–632, <https://doi.org/10.1542/peds.2005-1362>.
- [11] M. Cendron, Antibiotic prophylaxis in the management of vesicoureteral reflux, *Adv. Urol.* (2008), 825475, <https://doi.org/10.1155/2008/825475>, 2008.
- [12] T. Lee, J.M. Park, Vesicoureteral reflux and continuous prophylactic antibiotics, *Invest. Clin. Urol.* 58 (Suppl 1) (2017) S32–s7, <https://doi.org/10.4111/icu.2017.58.S1.S32>.
- [13] J. Köhler, J. Tencer, H. Thysell, L. Forsberg, Vesicoureteral reflux diagnosed in adulthood. Incidence of urinary tract infections, hypertension, proteinuria, back pain and renal calculi, *Nephrol. Dial. Transplant. Off. Publ. Eur. Dial. Transpl. Assoc. Eur. Ren. Assoc.* 12 (12) (1997) 2580–2587, <https://doi.org/10.1093/ndt/12.12.2580>.
- [14] B. Pereira, C. Macedo, S. Anacleto, M. Gonçalves, E. Lima, E. Carvalho-Dias, Late presentation of vesicoureteral reflux: an unusual cause of pyelonephritis in adults, *Int. J. Surg. Case Rep.* 53 (2018) 238–241, <https://doi.org/10.1016/j.ijscr.2018.10.058>.
- [15] J. Köhler, H. Thysell, J. Tencer, L. Forsberg, M. Hellström, Long-term follow-up of reflux nephropathy in adults with vesicoureteral reflux—radiological and pathoanatomical analysis, *Acta Radiol.* 42 (4) (2001) 355–364, <https://doi.org/10.1034/j.1600-0455.2001.420403.x> (Stockholm, Sweden : 1987).
- [16] J.R. Köhler, J. Tencer, H. Thysell, L. Forsberg, M. Hellström, Long-term effects of reflux nephropathy on blood pressure and renal function in adults, *Nephron Clin. Pract.* 93 (1) (2003) C35–C46, <https://doi.org/10.1159/000066639>.
- [17] Y.D. Choi, W.J. Yang, S.H. Do, D.S. Kim, H.Y. Lee, J.H. Kim, Vesicoureteral reflux in adult women with uncomplicated acute pyelonephritis, *Urology* 66 (1) (2005) 55–58, <https://doi.org/10.1016/j.urology.2005.01.034>.

- [18] J.R. Johnson, T.A. Russo, Acute pyelonephritis in adults, *N. Engl. J. Med.* 378 (1) (2018) 48–59, <https://doi.org/10.1056/nejmcp1702758>.
- [19] H. Lee, Y.S. Lee, Y.J. Im, S.W. Han, Vesicoureteral reflux and bladder dysfunction, *Transl. Androl. Urol.* 1 (3) (2012) 153–159, <https://doi.org/10.3978/j.issn.2223-4683.2012.06.09>.
- [20] K. Kieran, C.S. Cooper, Role of bladder dysfunction in vesicoureteral reflux, *Curr. Bladder Dysfunct. Rep.* 9 (3) (2014) 197–204, <https://doi.org/10.1007/s11884-014-0242-y>.