

# Renal vein thrombosis

## What is renal vein thrombosis?<sup>[1]</sup>

Renal vein thrombosis describes the presence of thrombus in the major renal veins or their tributaries. This may either present with acute symptoms or go unnoticed because of lack of symptoms until a complication such as [pulmonary embolism](#) or worsening renal function occurs.

## How common is renal vein thrombosis? (Epidemiology)<sup>[1]</sup>

- The overall prevalence is unknown, as renal vein thrombosis is probably underdiagnosed.
- Males are affected more commonly than females. There is no racial predilection. Almost two thirds of patients have bilateral renal vein involvement. In cases of unilateral thrombosis, the left renal vein is more often affected than the right.
- it is rare in children and usually due to severe illness, eg, asphyxia, severe infection, dehydration. However, renal vein thrombosis is the most common spontaneous thrombosis in neonates.<sup>[2]</sup>

## Aetiology

[Nephrotic syndrome](#) and membranous nephropathy are the most common causes.<sup>[1]</sup> Other causes include:

- [Renal cancer](#).
- [Renal transplantation](#). Transplant renal vein thrombosis usually occurs early after surgery with a reported prevalence of 0.1–4.2%. It ultimately leads to graft loss in almost all cases. The presentation of acute renal vein thrombosis is nonspecific and similar to the features of urine leak, urinary obstruction, or severe acute rejection.<sup>[3]</sup>

- [Behçet's disease](#).
- Hypercoagulable states.<sup>[4]</sup>
- [Antiphospholipid syndrome](#).

## Renal vein thrombosis symptoms (Presentation)

Symptoms may be difficult to differentiate from those of the underlying condition, eg, nephrotic syndrome or renal malignancy:

- Acute: loin pain, decline in renal function, [haematuria](#), renal enlargement, asymmetrical leg oedema, increased proteinuria in nephrotic syndrome.
- Chronic: there may be no symptoms or signs and it is detected by decline in renal function, increase in proteinuria or by being seen on abdominal [MRI scan](#).
- Other features of both acute and chronic forms are pulmonary emboli, increased peripheral oedema, dilated abdominal veins, left [varicocele](#) (if the left renal vein is thrombosed).

## Differential diagnosis

In the absence of any clearly identifiable underlying cause, it should be considered as a possible cause of:

- [Acute kidney disease](#).
- [Chronic kidney disease](#).
- Increased proteinuria or decline in renal function in patients with nephrotic syndrome.
- Pulmonary emboli with no lower limb [deep vein thrombosis](#).

## Investigations

- Serum creatinine and urinary protein (unexplained decline in renal function or sudden increase in proteinuria). Other laboratory investigations will depend on the clinical situation, eg, for nephrotic syndrome.

- Doppler ultrasound scan.
- Intravenous pyelogram (IVP) findings are rarely specific but may show an enlarged kidney. If the renal pelvis is observed, it is usually distorted. A characteristic but uncommon finding is notching of the ureter, caused by tortuous collateral veins near the ureters.
- Inferior vena cavography can be diagnostic but otherwise will need selective renal vein catheterisation to be performed.
- Renal arteriography may be useful in cases of renal trauma or tumour, when renal artery involvement is common.
- [Renal ultrasound](#) is usually not sensitive enough to assist in making the diagnosis.
- CT or MRI scanning is currently the procedure of choice for non-invasive diagnosis. They may also help detect the presence of a tumour.
- [Renal biopsy](#) is essential in evaluating patients with nephrotic syndrome.

## Associated diseases

- [Glomerulonephritis](#) (especially if it causes nephrotic syndrome) – most commonly membranous glomerulonephritis,<sup>[5]</sup> but may also be associated with membranoproliferative, minimal change or rapidly progressive glomerulonephritis. Also systemic lupus erythematosus (SLE) and amyloidosis.
- Renal cell carcinoma – by extrinsic pressure on the renal vein or invasion of the renal vein or inferior vena cava. May also be due to extrinsic compression by any other tumour or retroperitoneal mass.
- Trauma.
- Dehydration, especially in infants.
- Hypercoagulable states.
- May be associated with [thrombocytopenia](#).
- Post-renal transplantation.

# Renal vein thrombosis treatment and management

- [Anticoagulation](#).
- Thrombolysis therapy to break down the blood clot.
- Statins, [angiotensin-converting enzyme \(ACE\) inhibitors](#) or angiotensin-II receptor blockers decrease proteinuria from nephrotic syndrome.<sup>[6]</sup> Decreasing protein loss in the urine decreases hypercoagulability.
- Treatment of any underlying associated disease.

## Surgical

- Surgical treatment is rarely required.
- Inferior vena caval filters may be used in bilateral renal vein thrombosis.
- Surgery may be necessary for renal vein thrombosis caused by renal cell cancer.

## Complications<sup>[1]</sup>

- Recurrent thromboembolism, eg, pulmonary embolus.<sup>[7]</sup>
- [Acute kidney injury](#).
- [Chronic kidney disease](#).
- [Hypertension](#).
- Complications specific to the underlying cause, eg, graft failure after renal transplantation.

## Prognosis<sup>[1]</sup>

- Prognosis is variable. Renal vein thrombosis may resolve spontaneously or result in hypertension and renal failure.
- Prognosis also depends on age and comorbidities, as well as the underlying cause.

- Prognosis is determined by the effects on nephrotic syndrome, renal dysfunction or the complications resulting from thromboembolism.
- Prognosis of any underlying cause is worsened by the onset of acute renal vein thrombosis.
- Acute thrombus formation adversely affects graft survival after renal transplantation.

## Prevention

See the separate article [Prevention of Venous Thromboembolism](#).

---

## Further reading

- [Mazhar HR, Aeddula NR](#); Renal Vein Thrombosis. StatPearls, Aug 2022.
- [Monagle P, Cuello CA, Augustine C, et al](#); American Society of Hematology 2018 Guidelines for management of venous thromboembolism: treatment of pediatric venous thromboembolism. *Blood Adv.* 2018 Nov 27;2(22):3292–3316. doi: 10.1182/bloodadvances.2018024786.

## References

1. [Asghar M, Ahmed K, Shah SS, et al](#); Renal vein thrombosis. *Eur J Vasc Endovasc Surg.* 2007 Aug;34(2):217–23. doi: 10.1016/j.ejvs.2007.02.017. Epub 2007 Jun 1.
2. [Monagle P, Newall F](#); Management of thrombosis in children and neonates: practical use of anticoagulants in children. *Hematology Am Soc Hematol Educ Program.* 2018 Nov 30;2018(1):399–404. doi: 10.1182/asheducation-2018.1.399.
3. [El Zorkany K, Bridson JM, Sharma A, et al](#); Transplant Renal Vein Thrombosis. *Exp Clin Transplant.* 2017 Apr;15(2):123–129. doi: 10.6002/ect.2016.0060.
4. [Harris SL, Smith MP, Laurie A, et al](#); Neonatal renal vein thrombosis and prothrombotic risk. *Acta Paediatr.* 2010 Jul;99(7):1104–7. Epub 2010 Feb 11.
5. [Nickolas TL, Radhakrishnan J, Appel GB](#); Hyperlipidemia and thrombotic complications in patients with membranous nephropathy. *Semin Nephrol.* 2003 Jul;23(4):406–11.
6. [Bianchi S, Bigazzi R, Caiazza A, et al](#); A controlled, prospective study of the effects of atorvastatin on proteinuria and progression of kidney disease. *Am J Kidney Dis.* 2003 Mar;41(3):565–70.
7. [Janda SP](#); Bilateral renal vein thrombosis and pulmonary embolism secondary to membranous Indian *J Nephrol.* 2010 Jul;20(3):152–5.

**Disclaimer:** This article is for information only and should not be used for the diagnosis or treatment of medical conditions. Egton Medical Information Systems Limited has used all reasonable care in compiling the information but makes no warranty as to its accuracy. Consult a doctor or other healthcare professional for diagnosis and treatment of medical conditions. For details see our [conditions](#).

<b>Last updated by:</b> Dr Colin Tidy, MRCP 12/06/2023	
<b>Peer reviewed by:</b> Dr Hayley Willacy, FRCGP 12/06/2023	<b>Next review date:</b> 12/05/2028

View this article online at: [patient.info/doctor/renal-vein-thrombosis.htm](http://patient.info/doctor/renal-vein-thrombosis.htm)

Discuss Renal vein thrombosis and find more trusted resources at [Patient](#).



To find out more visit [www.patientaccess.com](http://www.patientaccess.com)  
or download the app



Follow us

