A case series of early presentation PE and DVT in renal transplant recipients

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Introduction

Deep venous thrombosis (DVT) and pulmonary embolism (PE) carry significant risks for complications and mortality. In kidney transplant recipients, there appears to be elevated risk for thromboembolic events especially in the first year after transplant. The exact cause is still undefined but likely multifactorial.

Factors reported in the literature were hospitalisation, surgical related factors, hypercoagulable state, chronic kidney disease and haemostatic dysregulation, pre-existing medical conditions, prior dialysis modality, post transplant erythrocytosis, procoagulant effects of immunosuppressants, past cytomegaloviral infection, delayed graft function and prior transplants.

The following describes the observation of a case series of patient presented with early onset DVT/PE post kidney transplant.

Objective

To present a series of cases of early onset deep vein thrombosis(DVT) and pulmonary embolism(PE) post kidney transplantation.

Literature Review

Surgery is a known risk factor for DVT/PE. The pattern of occurrence is well described for select surgeries, however, it's less clear for kidney transplant. Literature shows the DVT incidence after kidney transplant is 1.6-8.3% and 7.3-14% for PE. One study reported the standardised incidence ratio (kidney transplant to general population) was highest in first year at 5.2 times. Currently, there is no formal guideline on how to best reduce the risk of thromboembolic events in this patient population.

Clinical Features

These cases were diagnosed in 2017:

- A 53 year old male with polycystic kidney disease(PKD) developed PEs one month after kidney transplant. He had supratherapeutic tacrolimus levels.
- A 53 year old female with reflux nephropathy developed PE two weeks after kidney transplant. She was warfarinised, but represented with new PE.
- A 60 year old male with familial nephropathy developed PE and DVT one month post kidney transplant. He had delayed post-op prophylactic anticoagulation and recent kidney biopsy.
- A 63 year old female with PKD developed DVT one month after kidney transplant. She had prior post-partum DVT and family history.
- A 34 year old male with IgA nephropathy developed PEs one month post kidney transplant. He had supratherapeutic tacrolimus levels.

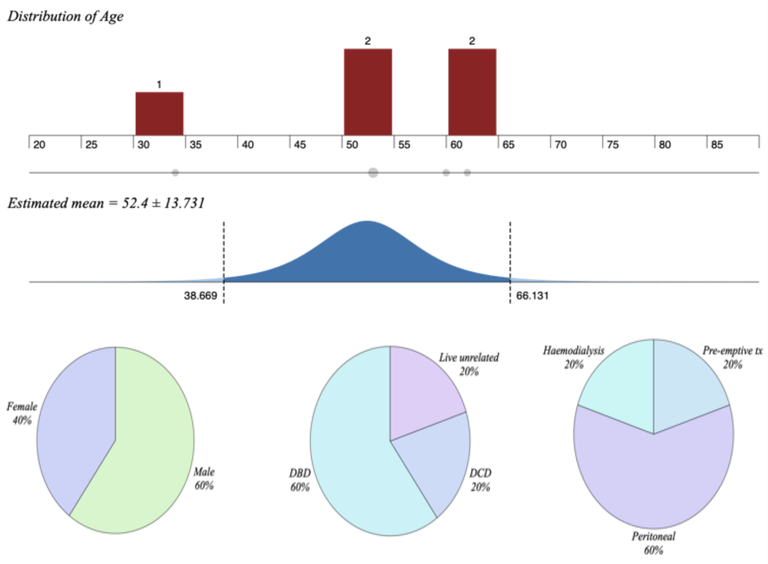
Case Progress and Discussion

All VTE events were symptomatic, diagnosed by CTPA/US/VQ and classified as provoked. All patients did not have thrombophilia and had negative prothrombotic screens. They were successfully treated with bridging heparin then warfarin. The median oral anticoagulation duration was 4 months (3 – 6).

Case Progress and Discussion

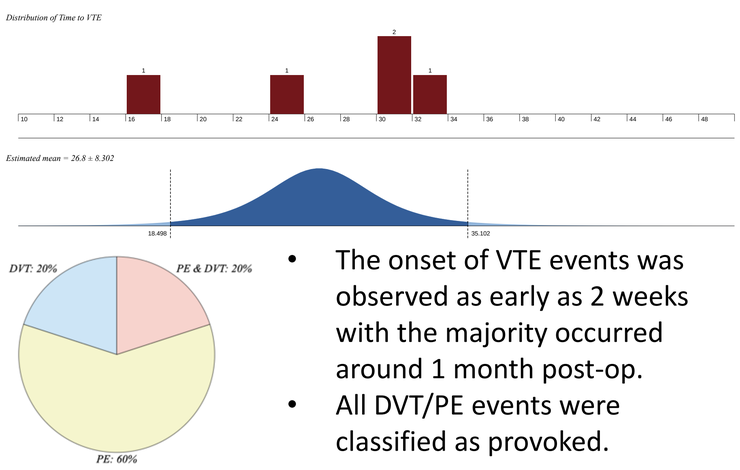
Risk factors identified were surgery, biopsy and related complications, calcineurin inhibitors, glucocorticoids, erythropoietin, prior dialysis modality, prior VTE and family history.

1. Age, sex, transplant type and prior dialysis modality distribution



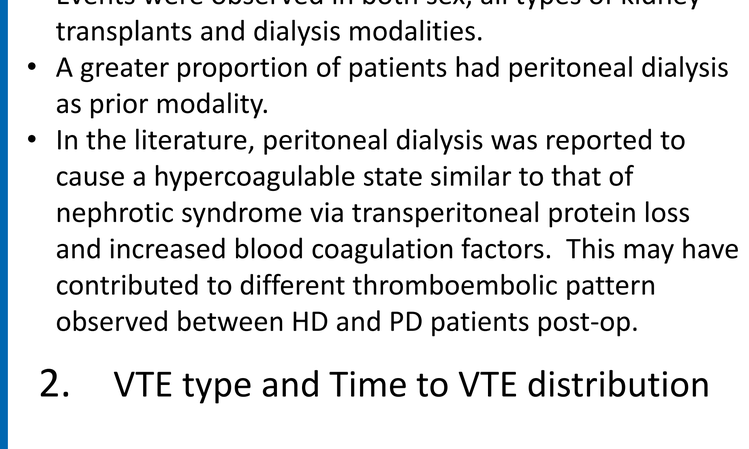
- Events were observed in both sex, all types of kidney transplants and dialysis modalities.
- A greater proportion of patients had peritoneal dialysis as prior modality.
- In the literature, peritoneal dialysis was reported to cause a hypercoagulable state similar to that of nephrotic syndrome via transperitoneal protein loss and increased blood coagulation factors. This may have contributed to different thromboembolic pattern observed between HD and PD patients post-op.

2. VTE type and Time to VTE distribution



- The onset of VTE events was observed as early as 2 weeks with the majority occurred around 1 month post-op.
- All DVT/PE events were classified as provoked.

3. VTE treatment and duration distribution

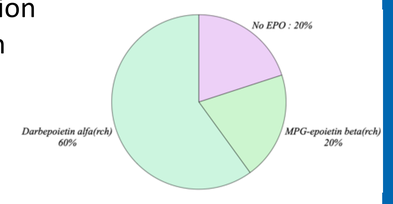


- All patient had received DVT prophylaxis post-op.
- The initial treatment for DVT/PE was either unfractionated heparin or low molecular heparin followed by Warfarin.
- The duration of oral anticoagulation varied between 3 to 6 months with a median of 4 months.

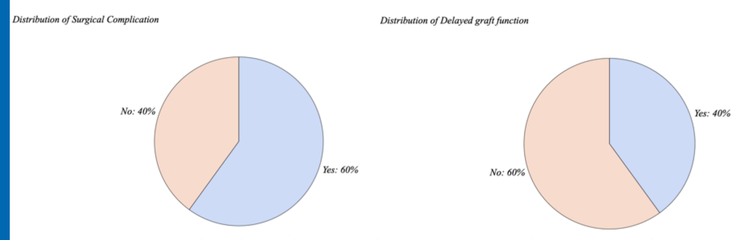
Case Progress and Discussion

4. Immunosuppressants and Erythropoietin

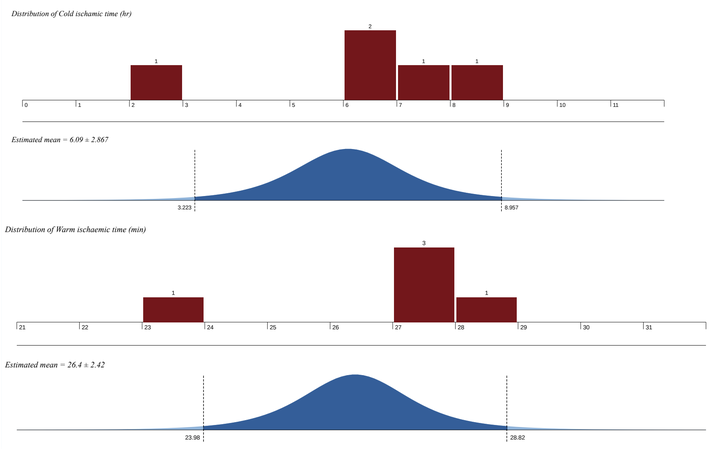
- All patients had received standard triple anti-rejection regimen of Tacrolimus, Mycophenolate and Prednisolone.
- Tacrolimus, Cyclosporin, Sirolimus and Steroid have all been implicated in thromboembolic events post kidney transplant according to the literature.
- Postulated mechanisms included hypercoagulable state from collagen induced platelet aggregation, elevated von Willerbrand Factor, monocyte activation, impaired fibrinolysis, increased prothrombotic tissue factor expression in endothelial cells and clotting factors.
- Most patients required erythropoietin supplementation post-op. Erythrocytosis from erythropoietin and post-transplant recovery are potential risk factors for VTE.



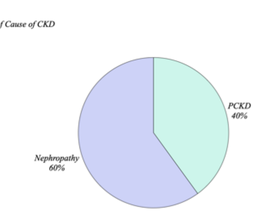
5. Surgical factors



- Surgery and related complications are known risk factors for DVT/PE. Three patients had experienced surgery related complications post-op. Two patients had delayed graft function.
- The cold and warm ischaemic times were similar for the kind of kidney transplant performed.



6. Disease state factors



- Patients with certain pre transplant conditions may be at higher risk for VTE post-op.
- In this case series, there were 3 patients with nephropathy (reflux, familial & IgA) and 2 patients with PKD.

Conclusion

Kidney transplant recipients are at a higher risk for thromboembolism due to transplant related and disease specific risk factors. We observed a pattern of early presentation that would support pre-emptive screening and extended surveillance.

Reference and Contact

References available upon request.

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