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Decreasing the Incidence of Tuberculosis in Renal Transplant Patients:
A Single Center Review

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Purpose

Tuberculosis (TB) affects one third of the global population. It is one of the primary causes of death from a curable communicable disease worldwide. In the U.S., 5-10% of the population will have a positive skin test. At any time, 90% of TB patients have latent infection while 10% have active disease. Latent TB has a 10% lifetime risk of becoming active, but much higher in the immunocompromised and those co-infected with HIV. Patients with ESRD (End Stage Renal Disease) on hemodialysis with latent TB infection have 10-25 times the risk of reactivation into active disease compared with healthy adults. In addition, diabetes is a major cause of ESRD and results in an increased risk of active TB. Therefore, ESRD patients with diabetes are at dual risk of developing active TB. Foreign-born individuals in the US, who make up approximately 10% of the population, accounted for >55% of the national case total. Individuals from Mexico, Philippines, India, Vietnam and China have the highest prevalence.

Skin testing (PPD) has awkward timing and false positives and negatives, especially in dialysis and immunosuppressed patients. QuantiFERON® – TB Gold (QFT-G) is a reliable blood test to screen for active or latent TB infection.

Why

In 2012, a renal transplant recipient died of active TB that was not discovered until post-mortem. The objective of the quality improvement project was to decrease the risk of active TB post-transplant by identifying and treating latent TB.

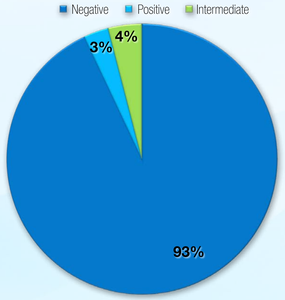
Methods

We attempted to screen for Tuberculosis (TB) by obtaining QuantiFERON® – TB Gold (QFT-G) in all pre- and post-transplant patients. QFT-G was added to the pre-transplant laboratory package to ensure all new patients are tested. All pre- and post-transplant patients (not previously tested) were mailed an information sheet and a QFT-G lab slip. At patient appointments, lab work is reviewed to ensure that we have received results; if not education is provided and another lab slip is given.

Actions

All patients with a positive result must obtain a CXR and be retested with QFT-G to confirm a true positive reading due to the incidence of false positives (<1%). Patients not previously treated were referred to Infectious Disease for treatment. Two regimens were utilized: Rifampin 600mg daily for 3 months and Isoniazid (INH) 300mg daily with Vitamin B6 50mg daily for 6-9 months. The Rifampin regimen is much shorter but causes staining of body fluids (ie tears, urine) and has drug interactions including Tacrolimus and Cyclosporine. The common treatment is INH taken for 6-9 months. The challenges with INH therapy is monthly liver function tests, strongly discouraged alcohol consumption, no acetaminophen use and a higher risk of non-compliance due to the longer course. Patients with an indeterminate result are reviewed on an individual case basis based on the patient's race, native country, recent travel exposures, physical exam and history to determine retesting with QFT-G, skin PPD or no further action.

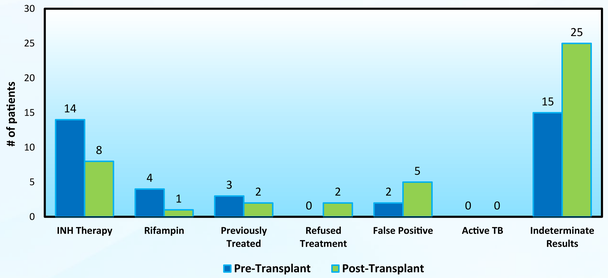
Pre- and Post- Transplant Patients Tested



Positive (Latent TB)	INH	Rifampin	Previously Treated	Refused Treatment
Pre-transplant	14	4	3	0
Post-transplant	8	1	2	2

Indeterminate Results	
Pre-transplant	15
Post-transplant	25

Outcomes of Positive and Indeterminate QFT-G



Results

567 pre-transplant patients (both in the evaluation process and listed) have been tested. Twenty one (21) patients had true positive results (i.e. duplicate positive QFT-G), of which 14 were treated with INH, 4 with Rifampin and 3 were previously treated. Two (2) patients were found to have false positives and fifteen (15) patients had indeterminate results.

488 post-transplant patients have been tested. Thirteen (13) patients were found to have true positive results, of which 8 were treated with INH, 1 with Rifampin, 2 previously were treated and 2 patients have declined treatment against medical advice. Five (5) patients were false positives and twenty five (25) patients had indeterminate results. Presently, 88 post-transplant patients have not been tested due to lost to follow up or are no longer in our area with no forwarding address.

Conclusions

While testing all pre- and post-transplant patients' required significant effort and cost (phlebotomy and QFT-G test costs approximately $1100 per patient), our center has captured many patients at risk for TB reactivation. In the interest of providing the best possible care to our patients we will continue to keep QFT-G in our pre-transplant laboratory package and in addition will attempt to capture the un-tested post-transplant patients at clinic visits at our institution.

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