

***Strongyloides* screening in solid organ transplant donors**

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Disclosures

- None

Objectives

- Review screening for *Strongyloides* in potential donors and recipients of solid organ transplant
- Identify epidemiologic risk factors for *Strongyloides* infection
- Discuss measures to prevent donor-derived or recipient-derived *Strongyloides* infection after solid organ transplant

Background

- *Strongyloides stercoralis* infection affects 100 million people worldwide
- Patients contract the infection by exposure to soil contaminated with unprocessed human fecal matter containing *Strongyloides* larvae
- Unlike most intestinal parasitic infections, *Strongyloides* parasites can reproduce within the host, and infection can last for many decades with few to no symptoms

Trans R Soc Trop Med Hyg. 2009;103(10):967-72.

Background

Strongyloides infection remains endemic in parts of the United States.

“Watch where you step,” Flowers said. She walked over to one of the mobile homes and pointed to a piece of PVC pipe jutting out from its base. “That’s where they run the sewage out,” she said, gesturing to a field in between houses that was covered with children’s toys and human feces; bouncy balls and scraps of soiled toilet paper. Working with tropical disease experts at Baylor College of Medicine in Texas, ACRE had recently begun collecting fecal samples from residents of this trailer park and others in the Black Belt for DNA testing. Of the 59 samples tested, 23 contained evidence of infection, primarily from hookworm. At one point, that parasite affected more than 40 percent of people in the South but was thought to have been eradicated in the United States in the early twentieth century.

Flowers said that, a few months earlier, one of the Baylor doctors had visited the trailer park and took some photos of the befouled field, which he posted to his Twitter account. “No one believed they were pictures of Alabama,” she said. “People thought they were from the Third World.”



<https://newrepublic.com/article/119019/civil-rights-movement-going-reverse-alabama>

Am J Trop Med Hyg. 2014; 91(5): 1000-1001.

Am J Trop Med Hyg. 2017; 97(5): 1623-1628.

Background

- Since *Strongyloides* can reproduce within the host, immunosuppression (iatrogenic or otherwise) can lead to a devastating hyperinfection syndrome with high mortality
- Accordingly, American Society of Transplantation guidelines recommend appropriate screening of donors and recipients prior to transplantation
- This is especially key if either have unexplained eosinophilia

Infection. 2005;33(5-6):383-6.

Curr Infect Dis Rep. 2011; 13:35-46.

[Am J Transplant](#). 2013 Mar;13 Suppl 4:9-21.

Am J Transplant. 2015; 15: 1369-1375.

Diagnosis

- Stool ova and parasite screen: essentially 100% specific but low sensitivity; requires 7 samples to conclusively rule out disease
- Commercial serology: Reasonably sensitive (75-100%), but lacks specificity due to cross-reaction with other helminths
- NIE serology: Equally or more sensitive, more specific as less cross-reactivity to other helminths as compared to commercial serology. Typically only available in research settings

Clinical infectious diseases. 2001;33(7):1040-1047.

PLOS Neg Trop Dis. 2014; 8(1):e2640.

J Infect Dis. 2008;198:444–451

Diagnosis

- I helped perform a study at Baylor St. Luke's/Texas Heart Institute comparing the commercial and NIE in over 100 pre- and post-transplant patients of foreign birth
- 9.6% of all patients had a positive commercial *Strongyloides* ELISA. 4.3% of all patients had a positive NIE Ss IgG ELISA (80% pre-transplant, 20% post-transplant). The NIE assay identified patients with potential *Strongyloides* infection who were negative by the commercial assay.
- Christina Coyle recently completed a study here with similar results

Diagnosis



David van Duin

@davidvanduin

Follow

Replying to @Rojelio

[@ShohamTxID](#) Based on poor test characteristics, we have pretty much abandoned testing in favor of empirical treatment with ivermectin in high-risk patients. Abstract C349 promised better results (less false+) with new NIH assay [#ATC2018Seattle](#)

6:56 AM - 5 Jun 2018 from [Seattle, WA](#)

Donor screening in LiveOnNY

- New York Organ Donor Network screening began July 2010.
 - Southeastern United States, Mexico, Puerto Rico, the Caribbean, Latin America, South America, Sub-Saharan Africa, Asia, India, and Oceania
 - Testing at Jacobi via NIE assay

[Am J Transplant. 2015 May; 15\(5\): 1369–1375.](#)

Donor screening in LiveOnNY

- 1103 potential donors screened 2010-2013
- 233 met criteria for Strongyloides screening
 - 10 positive (4.3%), of whom 7 became organ donors to 18 patients
- 17/18 recipients with follow up data, of whom 14 received prophylaxis (typically ivermectin 200 mcg/kg x 2 days, with repeat two weeks later)

Donor screening in LiveOnNY

Abanyie et al

Table 3: Donor and recipient characteristics with pretransplant positive *Strongyloides* antibody testing in donors at NYODN, 2010–2013

Donor	Year	Age/Sex	Birth country	Duration of US residence (years)	Organ(s) transplanted	Recipient(s) Age/Sex	Prophylaxis given to recipient posttransplant	<i>Strongyloides</i> infection in recipient post-transplant
1	2011	66/F	Haiti	12	LI	68/M	No	No
2	2011	39/F	US ¹	Unknown	RK	62/F	Yes	No
3	2011	19/M	Mexico	4	LI	63/M	Yes	No
					RK	12/F	Yes	No
					LK	12/F	Yes	No
4	2011	46/M	Ecuador	20	LI	55/M	Yes	No
					HT	54/M	No	No
					RK	61/F	NA	NA
					LK	44/M	Yes	No
					LI	47/M	Yes	No
5	2012	45/M	El Salvador	8	HT	44/M	No	No
					RK	45/F	Yes	No
					LK	56/M	Yes	No
					LI	64/F	Yes	No
					HT	59/M	Yes	No
6	2013	59/M	Guyana	7	RK	34/M	Yes	No
					LI	53/M	Yes	No
7	2013	60/M	Jamaica	7	LI	52/M	Yes	No

NA, information not available; RK, right kidney; LK, left kidney; LI, liver; HT, heart.

¹Travel to Jamaica, Haiti, Panama, Mexico.

[Am J Transplant. 2015 May; 15\(5\): 1369–1375.](#)

Donor screening outside New York

- Only 6/58 OPOs employ routine testing of at risk donors and OPOs outside New York may not have access to the NIE assay, leading to questions regarding how to manage recipients
- Nationwide, 22 donors have yielded 53 organs with no transmissions yet reported

- Cost per ivermectin pill: \$5 (as per Dr. Campbell)
- Prescribing ivermectin is likely easier, cheaper, and more efficacious than attempting to obtain blood for donor screening after the fact if an organ is obtained from an OPO which does not routinely screen for *Strongyloides*

Conclusions

- Given the efficacy of post-transplant ivermectin prophylaxis, donors with positive *Strongyloides* status can safely be used in transplantation as long as appropriate precautions are taken
- As negative serology is not foolproof, some centers in highly endemic areas rely on universal post-transplant ivermectin prophylaxis