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Title:

TRACHEAL DIVERTICULA IN ADVANCED CYSTIC FIBROSIS: PREVALENCE, FEATURES, AND OUTCOMES AFTER LUNG TRANSPLANTATION

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What was your research question?
Tracheal diverticula (TD) are pouches that can bulge from the sides of the main windpipe (trachea). We aimed to figure out how common TD are in patients with severe cystic fibrosis (CF) lung disease undergoing lung transplantation, describe the features of TD, and evaluate outcomes after transplant in affected patients.

Why is this important?
About 2% of the general (non-CF) population have TD, but recent studies show that they may be present in up to 28% of CF patients with mild-to-moderate lung disease. It is unknown how TD form in CF, why they are common, and whether they become even more common in patients with severe lung disease. It is also unclear whether these pouches are a source for infection and the resulting complications, especially after lung transplantation, where infectious risks are very important because of the medications used to suppress the immune system.

What did you do?
We reviewed chest computed tomography (CT) scans before transplant and medical charts of 93 CF patients who underwent lung transplantation at our centre between 1993 to 2015. We recorded how common TD were in these patients, along with CT scan features in those who had them. From the medical charts we recorded clinical factors that we felt may affect the formation of TD. In two patients who died, autopsies were performed to provide more

detailed TD characteristics. We then reviewed outcomes after transplant including survival, infections, and rejection, to see if having TD is linked with any post-transplant problems.

What did you find?
Thirty five (38%) of our 93 patients had TD. TD were less common in patients taking inhaled hypertonic saline before transplant, but there were no other clinical factors linked to their presence. In some cases, CTs revealed signs of inflammation in or around the pouches. Autopsies showed that TD were filled with pus growing the same bacteria as those patients' lungs, and that walls of the pouches and trachea were very inflamed. Despite these findings, after transplant patients with TD did not have a higher chance of death, re-infection of the new lungs, rejection, or problems with the new airways.

What does this mean and reasons for caution?
TD appear to be relatively common in CF, and may become more common as CF lung disease worsens. Although our study isn't definitive proof, it's possible that chronic coughing in CF increases pressure inside the trachea, slowly pushing the pouches out through what appeared to be inflamed (weakened) tracheal walls. Although TD had signs of infection, patients appeared to have satisfactory outcomes after lung transplantation. One limitation is that our study assessed just one centre.

What's next?
Future studies are needed to confirm our results in larger groups of CF patients, including evaluation of TD and other possible sources of infection after lung transplantation. It will also be important for studies to look at the impact of TD in CF patients with less severe lung disease.

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Figure: This figure shows a computed tomography (CT) scan from one patient in our study. The scan has been specially re-formatted to show a 3-dimensional view of the main windpipe (trachea) and tracheal diverticula (marked with arrows) protruding from the tracheal wall. This patient had several tracheal diverticula containing air.