Check for updates

Clonally Related Viable Nontuberculous Mycobacteria in Gastric Juice and Sputum in People with Cystic Fibrosis

To the Editor:

We congratulate Dawrs and colleagues for their investigation of a possible link between nontuberculous mycobacterial (NTM) pulmonary infections, gastro esophageal reflux, and microaspiration (1).

The authors hypothesize that NTM may be deposited into the lung through extra esophageal reflux and microaspiration following intake from potable water systems and environmental sources (1). The investigators used *in vitro* modeling approaches and pH-adjusted laboratory mycobacterial cultures to investigate the susceptibility of human airway epithelial cells to NTM infection. This was thoroughly done by employing submerged epithelial cultures and cells differentiated at an air–liquid interface. The study showed that a reference strain of *Mycobacterium abscessus* (American Type Culture Collection 19977) remained viable at pH 4 and 7.5, using an *in vitro* model of gastric juice conditions (1).

The *M. abscessus* complex (MABSC) is a major respiratory pathogen associated with accelerated decline in lung function and is a relative contraindication to lung transplantation in people with cystic fibrosis (CF) (2). We have previously shown that MABSC can be isolated from the gastric juice of people with CF fed by Percutaneous endoscopic gastrostomy. Clonally related clinical organisms were also isolated from matching sputum in patients with symptoms of extraesophageal reflux, who are routinely treated with antacid medication (3). Reports showing that gastric juice can be a useful clinical sample for diagnosing *M. tuberculosis* add plausibility to our finding that the gastric compartment may be a reservoir of viable NTM. Disruption of gastric barrier function, inherent to Percutaneous endoscopic gastrostomy surgery, has been associated with NTM infection (4).

Apart from NTM, we have also shown clonally related, biofilm-forming *Pseudomanas aeruginosa* isolates in the gastric juice and sputum of people with CF who reported associated symptoms of extraesophageal reflux (5). Viable fungal and bacterial microorganisms apart from MABSC and *P. aeruginosa* can be isolated from gastric juice sourced at gastroscopy in patients without lung disease when pH exceeds 4 (6).

We conclude that patient-derived gastric and airway sampling show the gastrointestinal compartment can be a reservoir for a range of microbiological organisms relevant to pulmonary diseases with exchange possible. *Ex vivo* patient findings compliment the *in vitro* study of Dawrs and colleagues and indicate that microaspiration of organisms including MABSC may constitute a microbiological challenge to the lung. More generally, we suggest that an increased awareness of integrated "aerodigestive" physiology and pathophysiology may be an important and timely area of research. ■

Author disclosures are available with the text of this letter at www.atsjournals.org.

Chris Ward, B.Sc., M.Phil., Ph.D.*
Newcastle University
Newcastle upon Tyne, United Kingdom

Hafez Al Momani, M.D., M.Res., Ph.D.
The Hashemite University
Zarqa, Jordan

Audrey Perry, M.Sc.
John D. Perry, M.Sc., Ph.D., F.I.B..M.S., C.Sci, D.Sc.
Newcastle upon Tyne Hospitals Trust
Newcastle Upon Tyne, United Kingdom

Amaran Krishnan, B.Med.Sci., M.B. B.S., M.R.C.S., M.D.
York Teaching Hospital NHS Foundation Trust
York, United Kingdom

Rhys Jones, M.B. B.S., M.Res., M.D., F.R.C.S.
South Tees Hospitals NHS Foundation Trust
Middlesbrough, United Kingdom

Mike Griffin, O.B.E., M.B. B.S., M.D., F.R.C.S.
The Royal College of Surgeons of Edinburgh
Edinburgh, United Kingdom

Jeff Pearson, B.Sc., Ph.D.
Newcastle University
Newcastle upon Tyne, United Kingdom

Stephen Bourke, M.D., F.R.C.P., F.R.C.P.I., F.C.C.P., D.C.H.
Royal Victoria Infirmary
Newcastle upon Tyne, United Kingdom

ORCID ID: 0000-0002-6954-9611 (C.W.).

*Corresponding author (e-mail: chris.ward@newcastle.ac.uk).

References

1. Dawrs SN, Kautz M, Chan ED, Honda JR. *Mycobacterium abscessus* and gastroesophageal reflux: an *in vitro* study [letter]. *Am J Respir Crit Care Med* 2020;202:466–469.
2. Haworth CS, Banks J, Capstick T, Fisher AJ, Gorsuch T, Laurenson IF, *et al*. British Thoracic Society Guideline for the management of non-tuberculous mycobacterial pulmonary disease (NTM-PD). *BMJ Open Respir Res* 2017;4:e000242.
3. Al-Momani H, Perry A, Jones R, Bourke S, Doe S, Perry J, *et al*. Nontuberculous mycobacteria in gastrostomy fed patients with cystic fibrosis. *Sci Rep* 2017;7:46546.
4. Chiu HY, Liu KL, Liao YH. Perigastrostomy infection caused by Mycobacterium abscessus in an immunocompetent patient. *Acta Derm Venereol* 2010;90:100–101.
5. Al-Momani H, Perry A, Stewart CJ, Jones R, Krishnan A, Robertson AG, *et al*. Microbiological profiles of sputum and gastric juice aspirates in cystic fibrosis patients. *Sci Rep* 2016;6:26985.
6. Jones R, Pearson J, Ward C. Functional dyspepsia. *N Engl J Med* 2016; 374:895.

Originally Published in Press as DOI: 10.1164/rccm.202005-1520LE on June 10, 2020