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Seasonal respiratory virus testing in management of adult cystic fibrosis patients

Sir,

Testing for respiratory virus infections (RVIs) is performed less frequently in patients with cystic fibrosis (CF), although they are known to contribute to bacterial infections and exacerbations by various mechanisms [1–3]. Thus, routine screening for such viruses may enhance the management of these patients [4]. Here we describe the incidence of RVIs over one season in our adult CF patients.

Between February 2016 and March 2017, there were two consecutive seasonal influenza outbreaks on our adult respiratory and CF patient ward. This prompted a PDSA (Plan, Do, Study, Act) quality service improvement evaluation to assess the utility of routine respiratory virus testing in the management of adult CF patients during a respiratory exacerbation. This had several aims, including: earlier RVI detection, early targeted antiviral treatment (for influenza alone), checking vaccination history and correlation with the test result (for influenza alone), and exploring the possible role of occupation in the exposure and acquisition of RVIs.

Routine screening for seasonal RVIs for all adult CF patients took place between November 2017 and April 2018. Respiratory virus swabs were taken by the CF nurses from all inpatients, ward attenders and outpatients with CF, and sent to the diagnostic laboratory for testing using a commercial respiratory virus multiplex polymerase chain reaction assay.

Of 37 adult CF patients presenting with an exacerbation, 13 had an RVI and 11 had more than one exacerbation. Of the 11 patients with more than one exacerbation, four were diagnosed with an RVI during one of these encounters. Of the 13 patients with an RVI, nine had non-influenza infections (two entero-/rhinoviruses, five NL63 and one HKU1 coronaviruses, one human metapneumovirus), three had influenza infections alone (two influenza A/H3N2, one influenza B), and one was multiply infected with influenza B, corona- OC43 and entero-/rhinoviruses.

Of the nine patients infected with non-influenza viruses, four were treated empirically with oseltamivir (one commenced oseltamivir treatment but did not complete the course, two completed oseltamivir treatment, one received post-exposure prophylactic oseltamivir). All four patients with laboratory-confirmed influenza received oseltamivir treatment.

Of the 24 patients who had no detectable RVI, one had commenced oseltamivir treatment empirically but did not complete the course, and four had completed oseltamivir treatment. Symptomatic cases were more likely to have been prescribed empirical oseltamivir treatment than asymptomatic cases, as per local seasonal influenza clinical guidelines.

Regarding influenza vaccination history, 24 of 37 patients had no detectable RVI, of whom 19 had been vaccinated against influenza in the preceding six months. Of the five unvaccinated patients, when asked why they had not attended for vaccination, one was unconcerned, three could not access the vaccine, and one had become unwell post vaccination in a previous season so had declined vaccination this season.

Of the four patients who had laboratory-confirmed influenza, three were not vaccinated due to a lack of concern and one had been vaccinated earlier in the season but became infected with late-season influenza. A history of influenza vaccination was found to be significantly higher ($P<0.05$) in the RVI-negative cases, indicating that this was a protective intervention.

We also investigated whether these adult CF patients had occupations that put them in frequent contact with potentially respiratory-virus-infected people. Of the 13 patients with a laboratory-confirmed RVI, six were unemployed, one worked from home and six worked in occupations with frequent public interactions. Of the 24 patients without any RVIs, 17 worked in occupations with regular public contact, five were unemployed, one was at college (with frequent contact with other students) and one worked from home. No significant ($P>0.4$) differences were identified between occupational status and positive or negative RVI status.

In summary, routine RVI screening allowed early influenza and non-influenza virus detection in 11% and 24% of patients, respectively. Early RVI detection allows the prompt treatment of any influenza cases, reducing the potential severity of possible secondary bacterial infective exacerbations. It also enables the timely implementation of appropriate infection control measures.

Influenza vaccination appears to be effective in reducing the risk of developing influenza virus infection, although this could be improved further with enhanced patient education

and access to vaccination. Late-season waning of influenza-vaccine-induced immunity should also be taken into account when the timing of the seasonal influenza immunization is being planned [5]. Occupational status does not appear to affect the risk of acquiring an RVI.

Following this service evaluation (PDSA Cycle 1), routine RVI testing is now being considered for all adult CF patients presenting with an exacerbation during the annual influenza season. Repeat cycle testing (PDSA Cycle 2) during the next influenza season on more patients will further assess the utility of this approach. Although clinical teams have traditionally focused more on bacterial and fungal infections in CF patients, RVIs can contribute to the severity of these other non-viral infective episodes. Early RVI diagnosis, treatment (currently only available for influenza) and appropriate isolation may reduce the subsequent impact on non-viral secondary infections.

Conflict of interest statement
None declared.

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