COVIDTrach; the outcomes of mechanically ventilated COVID-19 patients undergoing tracheostomy in the UK: Interim Report

Acknowledgments

COVIDTrach collaborative (see appendix)

Editor

COVIDTrach is a UK multidisciplinary collaborative project that evaluates the outcomes of tracheostomy in patients diagnosed with COVID-19 who are receiving invasive mechanical ventilation. In parallel, data is collected on the use of personal protective equipment (PPE) and rates of COVID-19 infection amongst operators. Between 6th April and 11th May 2020, data was received on 564 tracheostomies from 78 UK NHS hospitals. Results are given in brackets as a fraction of results received (n=results/number of results received).

The majority of patients were male (n=405/563, 72%) and BMI ranged from 18.5 to <25 (22%), 25 to <30 (35%), 30 to <40 (35%) and >40 (8%) (data available in 426 cases). The number of days from intubation (day 0) to tracheostomy ranged from 0-35 (median 16, IQR 13, 22) (data available in 543 cases). Prior to tracheostomy, the median Fi02 was 40% (IQR 30, 45) (data available in 555 cases) and the median PEEP was 8 (IQR 6, 10) (data available in 539 cases). An open method of tracheostomy was used in 58% of cases (n=323/560), a percutaneous method in 39% (n=217/560) and a hybrid method was used in 3% (n=20/560). A negative pressure environment was used in 10% of cases (n=55/530).

Fifty-two percent (n=219/465) of COVID-19 patients who had undergone tracheostomy and were still alive had been weaned from mechanical ventilation at the point of completing the survey (Table 1). At the point of survey, 38% (n=169/450) of patients who had undergone a tracheostomy had been discharged from intensive care. The all-cause in-hospital mortality following tracheostomy in COVID-19 patients was 12% (n=62/530) with two deaths attributed to post-operative tracheostomy complications and the other 60 (97%) recorded as “COVID-19 related”. As many of the patients are yet to complete their critical care, the mortality and weaning rates are likely to change with time. The success in tracheostomy decannulation and discharge from hospital will be evaluated in future reports.

Adequate PPE should be viewed as mandatory for tracheostomy in COVID-19 patients due to the significant potential for aerosol generation.[1,2] In all cases (n=545/545), operators used either an FFP3 mask or Powered Air Purifying Respirator (PAPR). Additional PPE used involved either a face visor or hood with face shield in 99% of cases (n=538/545), a disposable gown in 97% (n=527/545) and double gloves in 90% (n=490/545). The question “Did any of the operators test positive for COVID-19 within

two weeks of the procedure", was answered by 71% (n=400/564) and all confirmed that no operators had become COVID-19 test positive within two weeks of the procedure. Whilst this finding is reassuring, it is open to potential reporting bias and does not account for the remaining cases that are yet to reach the two-week time point.

The number of COVID-19 PCR tests performed prior to tracheostomy ranged from 1 to 12 (median 1, IQR 1,2). The COVID-19 test was positive in 86% (n=443/503) of patients prior to tracheostomy with the length of time from the last test to the day of surgery recorded as median 14 days (IQR 7,19). The role of identifying PCR test status in COVID-19 patients ahead of tracheostomy is unclear. ICU patients can remain test positive for several weeks after the onset of symptoms,[3,4] and whether the detection of viral RNA by PCR predicts risk of infectivity to operators and other health care professionals is uncertain. Delaying tracheostomy to achieve negative tests is likely to prolong endotracheal ventilation and thus defer the potential benefits of tracheostomy whilst increasing the risk of complications relating to endotracheal intubation.

References

1. Jessop ZM, Dobbs TD, Ali SR, et al. Personal Protective Equipment (PPE) for Surgeons during COVID-19 Pandemic: A Systematic Review of Availability, Usage, and Rationing. *Br J Surg.* 2020.
2. N. Kumar, P. Magennis. ENT.UK; BAOMS. https://www.entuk.org/sites/default/files/COVID%20BAOMS%20and%20ENT%202nd%20update%20FINAL.pdf. Published 2020. Accessed 28.07.20, 2020.
3. Zhao J, Yuan Q, Wang H, et al. Antibody responses to SARS-CoV-2 in patients of novel coronavirus disease 2019. *Clin Infect Dis.* 2020.
4. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet.* 2020;395(10229):1054-1062.

Appendix

COVIDTrach Collaborative Group

Writing group & steering committee

Nick JI Hamilton[1]*, Tony Jacob[2, a], Anne GM Schilder[3], Asit Arora[4], Manish M George[5], Frederick Green[6], Emma Jackson[7], John Goulder[8], Martin Birchall[1], Neil Sharma[9], Brendan McGrath[10], Guri Sandhu[5], Paul Stimpson[1], Peter Andrews[1], Taran Tatla[11], Neil Tolley[5], Imran Ahmad[4,b], Clare Schilling[1,e], Shondipon Laha[12,d], Nirmal Kumar[13, c]

1) University College London Hospitals NHS Foundation Trust
2) Lewisham & Greenwich NHS Trust
3) University College London, Ear Institute
4) Guy's & St Thomas' NHS Foundation Trust
5) Imperial College Healthcare NHS Trust
6) Leeds General Infirmary
7) Manchester Royal Infirmary
8) University College London Medical School
9) University Hospitals Birmingham NHS Foundation Trust
10) University Hospital of South Manchester
11) Northwick Park Hospital
12) Royal Preston Hospital
13) Wrightington Wigan & Leigh NHS Foundation Trust

a) Chair of the COVID-19 Tracheostomy Steering Committee
b) Difficult Airway Society representative
c) President of ENT UK
d) Intensive Care Society representative
e) British Association of Oral & Maxillofacial Surgeons representative

**Corresponding author*

Head & Neck Academic Centre, Division of Surgery & Interventional Science, University College London, Charles Bell House, 43-45 Foley Street, London W1W 7TY,

Nick.hamilton@ucl.ac.uk +44 (0)20 7679 2000

Collaborating co-authors (listed in order of cases contributed):

Guy's and St Thomas', Pavol Surda, Arun Takhar, Carol Xie, Eishaan Kamta Bhargava, Chrysostomos Tornari, Misha Verkerk, Mairead Kelly, Jennifer Collins, David Pennell, Nikul Amin, David Ranford; Imperial College Healthcare, Chadwan Al-Yaghchi, Lulu Ritchie, Mustafa Jaafar, Maral Rouhani, Margaret Ashcroft, Nicholas Cereceda-Monteoliva, Andrew Holroyd, Jimmy Ng; Barts & The Royal London, Khalid Ghufoor, Elinor Warner, Helen Drewery, Julia Hadley, Rishi Bhandari, Nabeel Bhatti, Hazel O'mahoney, Steve Shepherd, Henrietta Wilson, Mark Griffiths; St Georges Hospital – London, Aleix Rovira, Tiffany Munroe-Gray, Deborah Dawson; University College London Hospital, Priya Sethukumar; Addenbrookes – Cambridge University Hospitals, Irune Ekpemi, Rujuta Roplekar Bance, Katerina Karamali, Natalia Glibbery, Ciara Walker; Royal Papworth Hospital, Kamen Valchanov; Royal Bolton Hospital, Lucy Bates, Sumi Saha, Chloe Smart; Northwick Park Hospital – (LNWH), Tiarnan

Magos, Avgi Loizidou; Kingston Hospital, Michael Lee, David Allin, Ram Kumar; Newcastle upon Tyne Hospitals, Ben Cosway; Bradford Teaching Hospitals (BRI), Raad Glore, Eugene Omakobia; North Cumbria Integrated Care, Gemma Tattersall, Ben Hill, Will Udall; Wythenshawe Hospital – University Hospitals South Manchester, Sadie Khwaja, Rajesh Anmolsingh, Calum Smyth, Bakir Al-Dulaimy; East Surrey Hospital - Surrey and Sussex Healthcare, Karan Kapoor, Shahul Sirajuddin, Sean Fang, Fred van Damme; Tameside and Glossop Integrated Care, Daniela Bondin, Daniel Thorley; Royal Berkshire NHS Foundation Trust, Dilip Nair, Shivanthi Kandiah; Brighton & Sussex University Hospitals, Cameron Davies Husband, Casiano Barrera-Groba, Nicky Seymour, Sridhayan Mahalingam; Nevill Hall Hospital – Wales, Edward Leakey; NHS Lanarkshire – Scotland, Saleh Okhovat; Pinderfields General Hospital, Helen Buglass, Edward Tam, Usaama Sheikh; Royal Preston Hospital, Shondipon Laha, Sharada Suresh; University Hospital Southampton, Jennifer Westwood, Jennifer Smith, Mike Celinski; New Cross Hospital – Wolverhampton, Shayan Shahidi, Karan Jolly, Max Osborne, Jonathan Fussey; Eastbourne DGH - East Sussex Healthcare, Paul Kirkland, Johannes Staufenberg, Rishi Vasanthan; King's Mill Hospital - Sherwood Forest Hospitals, Saadatu Ladan, Pulak Paul, Paraskevi Tsirevelou, Valli Ratnam; West Middlesex University Hospital, Mohiemen Anwar, Agamemnon Pericleous; Wexham Park Hospital, James Bates, Ram Moorthy; James Paget University Hospitals – Great Yarmouth, Pieter Bothma, Sheneen Meghji; Royal Derby Hospital, Owen Judd, Tariq Ali, Thomas Stubington, Anand Kumar, William Parker, Timothy Davis; Royal Hampshire County Hospital, Andrea Burgess, Aikaterini Tsagkovits; John Radcliffe Hospital - Oxford University Hospitals, Stuart Winter, Thomas Hunt; Lister Hospital – East and North Hertfordshire NHS Trust, Ananth Vijendren, Vignesh Venkatachalam; Whipps Cross University Hospital, Matt Lechner, Deepak Chandrasekharan; Wrexham Maelor Hospital – Wales, Arvind Arya, Richard Brown; Arrowe Park Hospital – Wirral University Teaching Hospital, Venkat Srinivasan, Mustaffa Junaid; Countess of Chester Hospital, Robert Temple, Rohan Pinto, Umesh Nagalotimath, Rashid Sheikh, Colette Cook; Great Western Hospitals, Jessica Lunn; Manchester Royal Infirmary, Baskaran Ranganathan, Navin Mani, Haroon Saeed, Stefan Linton; Milton Keynes University Hospital, Richard Stewart, Seneka Nakagawa; Nottingham University Hospitals, Helen Turner; Raigmore Hospital Inverness - NHS Highland, Jonathan Whiteside, Jonathan Whiteside, Fergus Cooper; Chelsea & Westminster, Jonathan Collier, Patrick Ward, Christopher Lockie, Leda Lignos, Alona Courtney, Tim Browning; Doncaster and Bassetlaw Teaching Hospitals, Omar Mulla, Nicola Stobbs; Queen Elizabeth The Queen Mother Hospital – East Kent, Ana Alegria, Sam Starnes; Queens Hospital - Burton (UHDB), Adrian Thompson, Joshua Whittaker; Queens Hospital – Romford, Amro Hassan, Michaella Cameron; University Hospital Lewisham, Abigail Walker; West Suffolk Hospital, Laura Leach; Ashford & St Peter's Hospitals, Pardeep Gill; Belfast City Hospital, Luke McCadden; Dorset County Hospital, Susy Baker; Isle of Wight, Souvik Sanyal; Leicester Royal Infirmary, Sophie Wilkinson; Royal Liverpool University Hospital, Richard Siau; Stepping Hill Hospital – Stockport, Nimisha Vallabh; University Hospitals Bristol and Weston NHS Foundation Trusts, Emma Riley; Walsall Manor Hospital, Ahmad K. Abou-Foul.

For indexing

All co-authors - collaborators - (sites removed):

*COVIDTrach collaborative***

Elinor Warner, Lulu Ritchie, Mustafa Jaafar, Nicholas Cereceda-Monteoliva, Priya Sethukumar, Chloe Smart, Deborah Dawson, Tiarnan Magos, Avgi Loizidou, David Allin, Ram Kumar, Rujuta Roplekar Bance, Calum Smyth, Margaret Ashcroft, Maral Rouhani, Andrew Holroyd, Tiffany Munroe-Gray, Daniel Thorley, Shahul Sirajuddin, Will Udall, Ciara Walker, Eishaan Kamta Bhargava, Rakesh Mistry, Sharada Suresh, Arun Takhar, Carol Xie, David Ranford, Jennifer Collins, Mairead Kelly, Misha Verkerk, Nikul Amin, Chrysostomos Tornari, Sean Fang, David Pennell, Paraskevi Tsirevelou, Pulak Paul, Ben Hill, Agamemnon Pericleous, Sridhayan Mahalingam, Karan Jolly, Edward Tam, Shivanthi Kandiah, Thomas Stubington, Aikaterini Tsagkovits, Johannes Staufenberg, Thomas Hunt, Jennifer Smith, Jennifer Westwood, Mustaffa Junaid, Nicky Seymour, Jimmy Ng, Sheneen Meghji, Seneka Nakagawa, Usaama Sheikh, Richard Brown, Katerina Karamali, Natalia Glibbery, Abigail Walker, Rohan Pinto, Nicola Stobbs, Fred van Damme, Valli Ratnam, Haroon Saeed, Sam Starnes, Joshua Whittaker, Michaella Cameron, Bakir Al-Dulaimy, Umesh Nagalotimath, Owais Mattoo, Stefan Linton, Jonathan Fussey, Max Osborne, Colette Cook, Rashid Sheikh, Pavol Surda, Chadwan Al-Yaghchi, Khalid Ghufoor, Aleix Rovira, Irune Ekpemi, Kamen Valchanov, Lucy Bates, Michael Lee, Ben Cosway, Eugene Omakobia, Gemma Tattersall, Rajesh Anmolsingh, Karan Kapoor, Daniela Bondin, Dilip Nair, Cameron Davies Husband, Edward Leakey, Saleh Okhovat, Helen Buglass, Mike Celinski, Shayan Shahidi, Rishi Vasanthan, Saadatu Ladan, Mohiemen Anwar, James Bates, Pieter Bothma, Owen Judd, Andrea Burgess, Stuart Winter, Vignesh Venkatachalam, Matt Lechner, Arvind Arya, Venkat Srinivasan, Robert Temple, Jessica Lunn, Navin Mani, Richard Stewart, Helen Turner, Jonathan Whiteside, Jonathan Collier, Omar Mulla, Ana Alegria, Adrian Thompson, Amro Hassan, Laura Leach, Pardeep Gill, Luke McCadden, Susy Baker, Souvik Sanyal, Sophie Wilkinson, Richard Siau, Nimisha Vallabh, Emma Riley, Ahmad K. Abou-Foul

Ethics committee approval

COVIDTrach is classed as a service evaluation and collects de-identified anonymised data only. Using the UKRI & HRA decision tool (http://www.hra-decisiontools.org.uk/research/), ethical approval was not required for this project.

Data collection

Study data were collected and managed using REDCap electronic data capture tools hosted at University College London. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3)

Conflicts of interests

No conflicts to declare.

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