Journal club

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TREATMENT DECISIONS FOR PATIENTS REQUIRING NON-INVASIVE VENTILATION FOR AN EXACERBATION OF COPD: IT IS NOT JUST WHO YOU ARE BUT WHERE YOU ARE

Clinicians interpret a range of physiological, clinical and social variables when making treatment decisions such as the appropriateness of patients with exacerbations of COPD and respiratory acidaemia for non-invasive ventilation (NIV). Echevarria *et al* (*J COPD* 2020:DOI 10.1080/15412555.2020.1823358) retrospectively identified 420 patients from the DECAF study cohort who met accepted criteria for treatment with NIV (pH <7.35 and $PaCO_2$ >6 kPa). The DECAF study was a UK multicentre study designed to assess prognosis in patients hospitalised with exacerbations of COPD. Patients with respiratory acidaemia were divided into those receiving NIV and those not. Bivariate and multivariate analysis were used to identify indices associated with NIV treatment. Of 420 patients with respiratory academia, 309 were treated with NIV. A number of factors were identified as being predictors of initiating NIV in patients with acidaemia with cerebrovascular comorbidity (OR 0.52, 95% CI 0.36 to 0.77) and being in residential care (OR 0.20, 95% CI 0.09 to 0.44) being associated with lower odds of receiving NIV. Pneumonia was not a factor in decision to use NIV, with consolidation present in 30.6% not given NIV versus 34.6% who were given it (p=0.483). Interestingly, NIV use varied widely depending on the admitting hospital (OR 0.40 to 1.74 at five centres). The study highlights that decision making on delivery of an evidenced based treatment may be influenced by institutional factors as well as an individual patients physiological, clinical and social factors.

PHYSIOLOGICAL EFFECTS OF ADDING ECCO2R TO INVASIVE MECHANICAL VENTILATION FOR COPD EXACERBATIONS

Given the poor prognosis of invasive mechanical ventilation (IMV) in patients with COPD, extracorporeal CO_2 removal has been investigated as a method of facilitating weaning. Diehl *et al* (*Ann Intensive Care* 2020;10:126) investigated whether addition of extracorporeal CO_2 removal (ECCO2R), implemented using a prespecified algorithm, to IMV improves intrinsic positive end expiratory pressure (PEEPi). Secondary outcome measures included pH and $PaCO_2$. Patients undergoing IMV for an exacerbation of COPD with persistent acidaemia at 72 hours despite optimal therapy were included. PEEPi did not improve with ECCO2R (pretreatment 8.5 (7.0 to 10.0) cm H_2O, post 8.0 (5.0 to 9.0) cm H_2O, p=0.1191). All patients had a reduction in $PaCO_2$ (68 (63 to 76) mm Hg to 49 (46 to 55) mm Hg, p=0.005) and pH (pretreatment 7.25 (7.23 to 7.29), post 7.35 (7.32 to 7.40), p=0.0005). Invasive pulmonary mechanics could only be completed in five patients and these indicated a trend to reduced work of breathing with ECCO2R. Nine patients survived until discharge. The specific algorithm used in this study which targeted a set $PaCO_2$ rather than using the device to allow for a reduction in IMV parameters to reduce possible ventilator associated lung injury could explain the lack of change in the primary outcome. While ECCO2R shows physiological effects in this patient group the impact on clinically meaningful outcomes remains unclear.

INHALED CORTICOSTEROIDS AND RISK OF OSTEOPOROTIC EVENTS IN PATIENTS WITH COPD: MORE DATA TO INFORM PRESCRIBING DECISIONS

The link between systemic steroids and osteoporosis is well documented; however, it is less clear whether this extends to inhaled corticosteroids (ICS). Janson *et al* (*Eur Respir J* 2020: doi.org/10.1183/13993003.00515-2020) used data from the real-world ARCTIC study and primary care registries to assess the impact of ICS and osteoporosis. A total of 9651 patients aged >40 years old with a physician diagnosis of COPD were selected and matched by age and gender with 59454 patients without COPD, asthma or documented steroid exposure. Patient records were analysed for: (1) any fracture, (2) osteoporotic fracture, (3) osteoporosis diagnosis, (4) prescription of osteoporotic medication and any osteoporotic event (outcomes 2–4). ICS use was stratified into high (≥640 µ/day of budesonide equivalent; n=580) or low (<640 µ/day; n=4256) dose. Patients with COPD had higher rates of osteoporotic events compared with controls (19.9% vs 12.9%; p<0.0001) with a stepwise increase in osteoporotic fractures from no ICS (rate ratio 1.16; 1.04 to 1.57) through low (1.28; 1.17 to 1.63) to high (1.37; 1.21 to 1.51) ICS exposure. Multivariate analysis in the patients with COPD also demonstrated a dose effect for any osteoporotic event (low ICS 1.27; 1.13 to 1.56, high 1.52; 1.24 to 1.82). When comparing the results to those from clinical trials of ICS, the longer term follow-up may account for the strengthened association. However, as with all database studies, the accuracy of the data entry needs to be considered with significantly more patients on osteoporosis preventative medication than documented to have a diagnosis of osteoporosis. Furthermore, there are missing data on severity of COPD and importantly physical activity that could potentially act as confounders and limit any causative inference from the results. Data on important factors such as smoking status or obesity were also lacking. The study provides a further reminder to clinicians to ensure that ICS prescriptions for patients with COPD are reviewed and revised to ensure appropriate consideration of risks as well as benefits.

PNEUMONIA IN PATIENTS IN CRITICAL CARE REMAINS COMMON

Despite nosocomial pneumonia causing high levels of morbidity and mortality in patients admitted to critical care, there remains a lack of useful tools to identify high-risk patients to target potential new interventions. Bergin *et al* (*Chest* 2020: doi: 10.1016/j.chest.2020.06.034.) describe a contemporary cohort of patients at high risk of nosocomial pneumonia within critical care. The study identified 4613 patients admitted to 28 US critical care units with high levels of respiratory support considered at risk for nosocomial pneumonia. Of the high-risk group, 1464/4613 (32%) were treated for pneumonia although only 537 (12%) met the study criteria for hospital or ventilator associated bacterial pneumonia over the follow-up period (median 7 days). The majority (64%) of patients meeting the study criteria for nosocomial pneumonia had identifiable pathogens to direct antimicrobial therapy. Using logistic regression, factors predicting study defined pneumonia were identified. Factors associated with significantly (p<0.001) increased risk of pneumonia included admission diagnosis trauma or cerebrovascular accident, receipt of enteral nutrition, documented aspiration risk and receipt of systemic antibacterial treatment within the preceding 90 days. Treatment for nosocomial pneumonia within critical care remains common and many of those treated do not meet the accepted diagnostic standards demonstrating a large discrepancy between practice and guidance. Prospective identification of patients at high risk of nosocomial pneumonia may allow more selected therapy and assist antimicrobial stewardship.

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