Effect of Dexamethasone protocol on peak C-reactive protein, incidence of positive blood cultures and ICU mortality in invasively ventilated SARs-CoV-2 patients

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Introduction

Severe COVID-19 viral pneumonitis, requiring invasive mechanical ventilation, has a mortality rate approaching 45% (1). The RECOVERY trial demonstrated that Dexamethasone protocol (6 mg a day for up to 10 days, commenced early) decreased 28 days' mortality for this cohort from 41.4% to 29.3% (OR 0.64; 95% CI 0.51-0.81) (2). More generally, a study confirmed corticosteroids' beneficial effect in COVID-19 patients which was more prominent in females, younger patients (<65) and with higher C-reactive protein (CRP) levels (in excess of 150 mg/L). Importantly, it did not increase incidence of bacteremia or fungemia (3). In another study, responders to corticosteroids (more than 50% of CRP levels reduction in 72 hours) had reduced risk of death (25.2% vs. 47.8% in non-responders; OR 0.37, P<0.001) (4).
In our district general hospital the Dexamethasone protocol was introduced and used consistently at the beginning of COVID-19 second wave. Therefore, an impact of this intervention could be detected by comparing the outcomes between SaRS-CoV-2' patients admitted during Wave-1 versus Wave-2.
Concomitant antibiotics (Co-amoxiclav and Clarithromycin) were introduced at the same time, but this practice varied.

Methodology

Objectives
To detect impact of Dexamethasone protocol on COVID-19 invasively ventilated ICU patients' outcomes by using retrospective analysis.

Methods
The information on ICU mortality, peak CRP levels (irrespectively of peak-time, but most manifested within 10 days from admission) and incidence of positive blood cultures (if resulted from both sampling tubes) was collected from trust databases after the last patient's ICU discharge.
Wave-1 was defined as SARS-CoV-2 PCR confirmed patients admitted to the hospital from 1/3/2020 until 31/5/2020. Wave-2 period was from 1/10/2020 until 28/2/2021.
Mann Whitney U test was used for CRP numbers.

Results

Number of ICU patients requiring mechanical ventilation: 34 (W-1) versus 39 (W-2).
There was no statistical difference in age and gender.
ICU mortality was: 41% (W-1) versus 44% (W-2).
Incidence of bacteremia was: 24% (W-1) versus 46% (W-2). The bulk of the difference was due to coagulase negative coccal flora and Staphylococcus epidermidis; increase from 1 to 11 cases.
Medians (quartiles 1 - 3) of peak CRP levels were: 336 (264 - 415) (W-1) versus 264 (172 - 379) (W-2), P-0.042. The difference was even more pronounced when looking at peak CRPs of W-2 survivors: median 234 (150 - 270). It was statistically significant for this group in comparisons between W-2 non-survivors and W-1 survivors, P - 0.021 and 0.017 correspondingly.

Conclusions

Our data (bearing in mind loss of some due to inter-hospital transfers and overall limited numbers) did not demonstrate any significant difference in ICU mortality of mechanically ventilated patients which could be attributed to the protocol.
Statistically significant differences in average peak CRP levels between the COVID-19 waves (especially for Wave-2 ICU survivors) may be explained by the Dexamethasone protocol impact. This agrees with previous data (4).
There was a significant increase in incidence of positive blood cultures due to bacterial flora usually considered contaminants.

References

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