

Profile of Patients under Mechanical Ventilation in ICU during COVID-19 Pandemic: a Hospital Based Study

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ABSTRACT

Background: COVID-19 has become unprecedented challenge to ICU management. The measures for containment of the disease and mitigation can be possible only with a proper and organized planning. This study was conducted to evaluate the profile of mechanically ventilated patient in ICU of a Hospital in remote high altitude region during this pandemic.

Methods: A cross-sectional study was done in patients who were admitted and managed with intubation and mechanical ventilation in ICU of Karnali Academy of Health Sciences (KAHS). Data were collected and filled in per-forma. Data were filled in Microsoft Excel and analysis done.

Result: Most of the cases were adult males with 50% average intubation days less than five. Out of the total 42 cases 67% were intubated for inadequate airway protection and 33% for respiratory failure. PCR test for COVID-19 was done for 50% of cases and one patient got positive result. Mortality was around 50% among intubated patients in ICU.

Conclusion: ICU services at Karnali Academy of Health Sciences have been provided for both COVID and non-COVID patients during the pandemic. Referral hospital ICUs in remote part are important in management of serious cases of those areas during any pandemic so they should be well prepared.

Key-words: COVID-19, intubation, mechanical ventilation, pandemic.

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INTRODUCTION

Corona virus disease 2019 (COVID 19) has become health and economic disaster.^{1,2} As it continues to spread exponentially, health care system most importantly the intensive care units (ICU) face variety of unprecedented challenges.³ With the rapid surge in number of critically ill patients and the resource limited infrastructure, the health care system of Nepal has been hardly hit as well.⁴ The measures for containment of the disease and mitigation can be possible only with a proper and organized planning.⁵

The intensive care unit in Karnali Academy of Health Sciences, Jumla has a six bedded level 3 ICU. As any other unit, we have faced a dual role in managing both COVID as well as non-COVID patients and preventing nosocomial spread to other patients and health care workers. In addition, resource and staff limitation has been equally troublesome to manage.

The planning of effective resource management specially staffing, personal protective equipments, medications and equipments is essential.⁶ In order to limit spread, a highly suspicious approach is necessary and segregation of patients based on clinical criteria seems to be an important strategy.⁷ Apart from this, a low threshold for RT-PCR testing for patients and a well-rehearsed infection prevention and control strategy is needed.⁸ Thus a COVID taskforce was created at the start of pandemic and strategic management plan to deal with these challenges was put into place.

This audit was conducted to look for the effectiveness of the strategies and the outcome of intensive care management form

14th March to 16th September. As lockdown was started due to high case load in Nepal from 24th March risk of infection was high in Karnali region due to influx of migrant worker.⁹

METHODOLOGY

A descriptive cross-sectional study of all admissions in ICU at Karnali Academy of Health Sciences (KAHS) teaching hospital, a tertiary care center between 14th March 2020 to 16th September 2020 was conducted. It provides critical care facility to all patient including pediatrics, adult, surgical and medical cases. The catchment areas of KAHS include Jumla where it is situated and the nearby districts like Kalikot, Mugu, Dailekh and Jajarkot. It is the referral centres of these areas and receives patients from district hospitals, Primary Healthcare Centres and Health-posts of these areas.

Ethical approval was taken from the Institutional Review Committee, KAHS. All patients during the study period that were intubated and mechanically ventilated were included in the study. The previously admitted patients and the patients whose record were not complete were excluded.

Data from the record of ICU were collected. Patient that required intubation and mechanical ventilation were identified. Demographic data including Age, sex were noted. Indications for ICU admission, indications of intubation, days of intubation and mechanical ventilation, RT- PCR for covid-19 availability and its report, and final outcome of the patients were recorded. These data were filled in the per-forma. They were then entered in Microsoft excel and various frequencies and percentage were calculated and presented in tables and figures.

RESULTS

Total number of patients that were included in the study during the study period were 42. Most of the patient were from adult age group 14- 60 years (53%). There were few pediatric age group <14 years (30%) and geriatric age group >60 years (17%). Male patients account more than the female patients in ICU.

Table 1: Age and sex distributions of patients.

Age in years	<14	13(30%)
	14-60	22 (53%)
	>60	7 (17%)
Sex	Male	25 (60%)
	Female	17 (40%)

Indication of intubation and mechanical was mostly due to inadequacy of airway protection i.e. decrease in GCS (Glasgow Coma Scale) than respiratory failure i.e. decrease in saturation or decrease in PaO₂ in ABG (Air Blood Gas) analysis (Figure 1). Most of the cases with inadequate airway protection were neurosurgical cases with head injury.

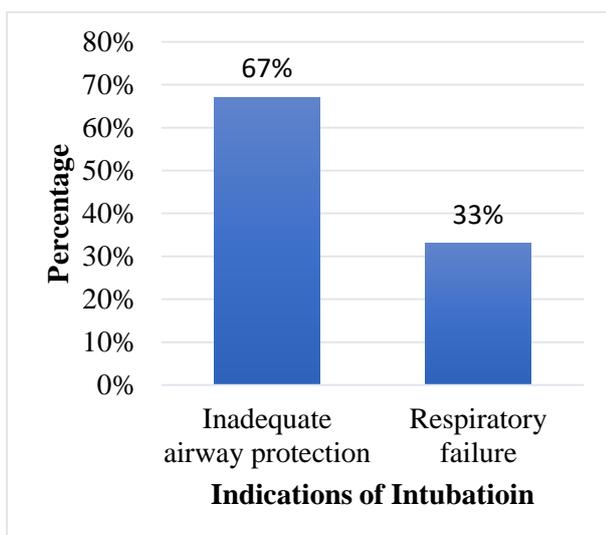


Figure 1: Indication of intubation during pandemic

Polymerase Chain reaction (PCR) test for Covid-19 was done for half of the cases and only one case was detected as COVID- 19 (table 2).

Table 2: PCR test for COVID- 19 in ICU in intubated patients during pandemic.

Test Status	Response	Frequency (%)
PCR test	yes	22 (52%)
	no	20 (48%)
If yes	positive	1 (5%)
	negative	21 (95%)

Majority of cases were fatal and expired (48%). Few cases were extubated and discharged to ward (35%) and few left against the medical advice (LAMA) or refer to other center on request (17%) (Table 3).

Table 3: Final outcome of intubated patients in ICU during pandemic.

Final outcome	frequency	Percentage
Discharge to ward	15	35
Death	20	48
LAMA/ refer on request	7	17
Total	42	100

Most of the cases were mechanically ventilated for less than five days especially more cases were dead within 48 hours of intubation and mechanical ventilation. Very few cases were mechanically ventilated for more than 10 days (16.67%) and require tracheostomy for definitive airway protection. Mean intubation period in ICU was seven days (Figure 2).

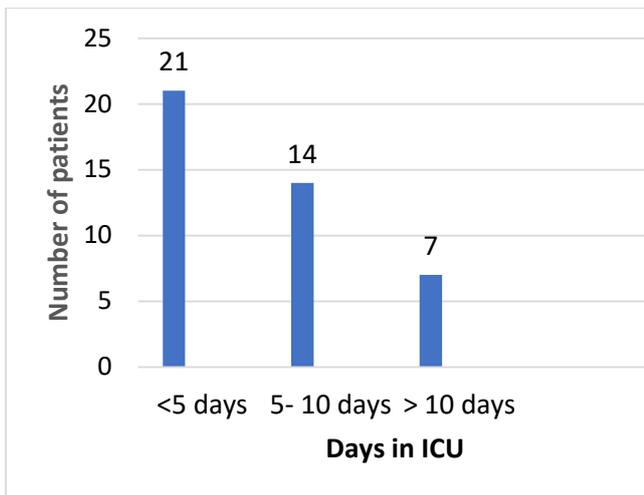


Fig. 2: Number of patients according to days of intubation in ICU during COVID pandemic

DISCUSSION

Our study consisted 42 patients admitted in ICU and mechanically ventilated. Most of the patient were from adult age group 14- 60 years (53%) as there is separate neonatal ICU (NICU) in the hospital. The combination of pediatrics and adult patients in same ICU increases complexities to practitioners.¹⁰ Male patients were more than female. This may be because of decrease priorities to female patients than to male patients in Nepal especially in rural part of Nepal.¹¹

Indication of intubation and mechanical was mostly due to inadequacy of airway protection i.e. decrease in GCS (Glasgow Coma Scale) than respiratory failure i.e. decrease in saturation or decrease in PaO₂ in ABG (Air Blood Gas) analysis. Those cases with inadequate airway protection or decreased GCS were surgical cases especially from neurosurgery with head injury. In a study conducted by Acharya et al. in a tertiary ICU of Nepal Neurosurgical cases were the most common (24.48%).¹²

Majority of cases had fatal outcome (48%). Few cases were extubated and discharged to ward (35%) and few left against the medical

advice (LAMA) or refer to other center on request (17%). In a similar study the mortality of cases that got mechanically ventilated in ICU were high.^{13,14}

PCR test for COVID-19 was done only in 50% of ICU intubated patients. PCR is considered gold standard for diagnosis of COVID-19.¹⁵ In early period of pandemic PCR test was unavailable in the institute. After installation of PCR lab it started doing PCR for all cases in ICU. Later the case seems to be decreased and no cases in isolation and community routine PCR test was interrupted. When one cases tested positive in surgical ward than all symptomatic cases in ICU got PCR tested and one case tested positive. Containment and management of case of covid-19 is ideal.¹⁶ Case was contained and managed properly in order to treat the patient at the same time prevent infection to other patient as well as the managing staffs.

Most of the cases were mechanically ventilated for less than five days (50%) and many were dead within 48 hours of intubation and mechanical ventilation. Very few cases were mechanically ventilated for more than 10 days (16.67%) and require tracheostomy for definitive airway protection. Mean intubation period in ICU was seven days. The average length of stay in a mechanically ventilated patients in ICU was 10.0 ± 7.2 days¹⁷ in a study and 8.09 ± 10.73 ¹⁸ in another study from different places.

CONCLUSION

ICU services at Karnali Academy of Health Sciences have been provided for both COVID and non-COVID patients during the pandemic. Referral hospital ICUs in remote part are important in management of serious cases of those areas during any pandemic so they should be well prepared.

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