

intubation, or cardiac arrest needing resuscitation. Cardiac arrest was defined as the sudden cessation of cardiac activity so that the victim becomes unresponsive, with no normal breathing and no signs of circulation. Aspiration was defined as an observation of gastric contents at the glottis opening or in the endotracheal tube, in addition to diagnosis by radiologist in chest radiography taken after intubation.

All patients were followed up until death or discharge from the hospital. The outcome was evaluated by Charlson comorbidity score, complications, survival and Cerebral performance category (CPC). [1. Good Cerebral Performance (Normal Life), 2. Moderate Cerebral Disability (Disabled but Independent), 3. Severe Cerebral Disability (Conscious but Disabled and Dependent), 4. Coma/Vegetative State (Unconscious), 5. Brain Death (Certified brain dead or dead by traditional criteria)].

RESULTS

There were total 186 emergency endotracheal intubation calls for the Anesthesiologist. Demographic characteristics (Age, gender and BMI) were not significantly different between General ward, CCU and Triage. The proportion of hypertension, Chronic kidney disease and total CCI score were higher in the General ward than in CCU and Triage.

Most frequent indication for intubation in all patients was respiratory failure (n=87 (46.77%)), followed by GCS<8 [n=54 (29.03%)], hemodynamic collapse [n=34 (18.2%)], and Cardiac arrest [n=11 (5.91%)]. In General ward and Triage, respiratory failure was the most frequent indication for intubation [n=40 (64.5%) and n=28 (45.16%), respectively], (p=0.017) However, in CCU, the most frequent indication for intubation was GCS<8 [n=27 (43.55%)], (p=0.007) followed by respiratory failure [n=19 (30.6%)].

In General ward, 24 (38.71%) patients received anesthetic agent for intubation & 13 (20.97%) received both anesthetic agent and muscle relaxant to facilitate intubation. In CCU, 22 (35.48%) patients received anesthetic agent only, where as 10 (16.13%) received both anesthetic agent and muscle relaxant to facilitate intubation. Similarly in Triage, 31 (50%) patients received anesthetic agent only & 22 (35.48%) received both anesthetic agent and muscle

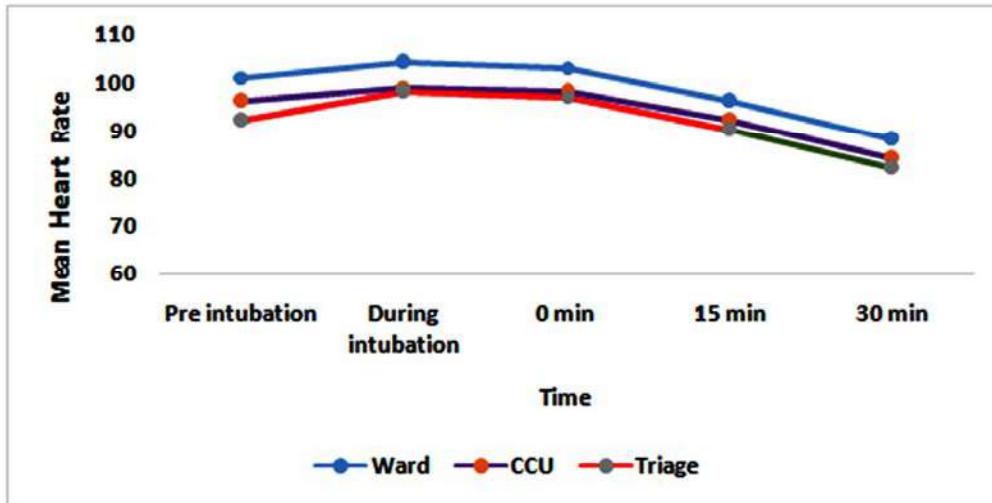
relaxant. (p=0.009).

Bougie guided intubation was mostly performed in the CCU [n=26 (41.94%)] (P=0.013) where as stylet was mostly used in the Triage (n=22(35.48%), (P=0.024).

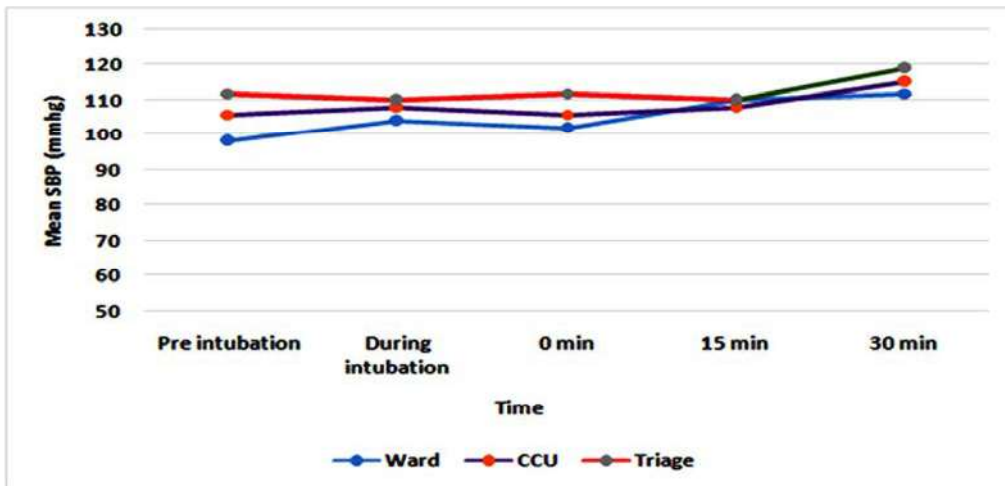
Of the 186 patients, 119 (63.97%) were recognized as difficult intubation by the Anesthesiologist and no difficulty was faced while intubating 63 (33.87%) patients. Among the three areas, General ward had the highest proportion of difficult intubations [n=42 (67.74%)], followed by Triage [n=39 (62.9%)], and CCU [n=38 (61.29%)]. There were total 04 (2.15%) failed intubation & among these, General ward had 03(4.83%) and 1 (1.61%) was in Triage (P=0.74).

Of all 186 patients, 44 (23.65%) patients presented with hypoxemia where as hemodynamic collapse was noted in 21(11.2%), Cardiac arrest in 13(6.45%), aspiration of gastric content in 10 (5.37%) and oesophageal intubation in 06 (3.22%) patients. Incidence of aspiration was similar in General ward [n=4 (6.45%)], CCU [n=2 (3.22%)] and Triage [n=4 (6.45%)] (P=0.65). However, the incidence of hypoxemia [n=21 (33.87%)] and hemodynamic collapse [n=08 (12.9%)] was higher in General ward as compared to CCU [n=08 (12.9%) & n=06 (9.68%)] and Triage [n=15 (24.19%), n=07 (11.2%)]. (P=0.02 & 0.04 respectively). There was no incidence of oesophageal intubation in CCU.

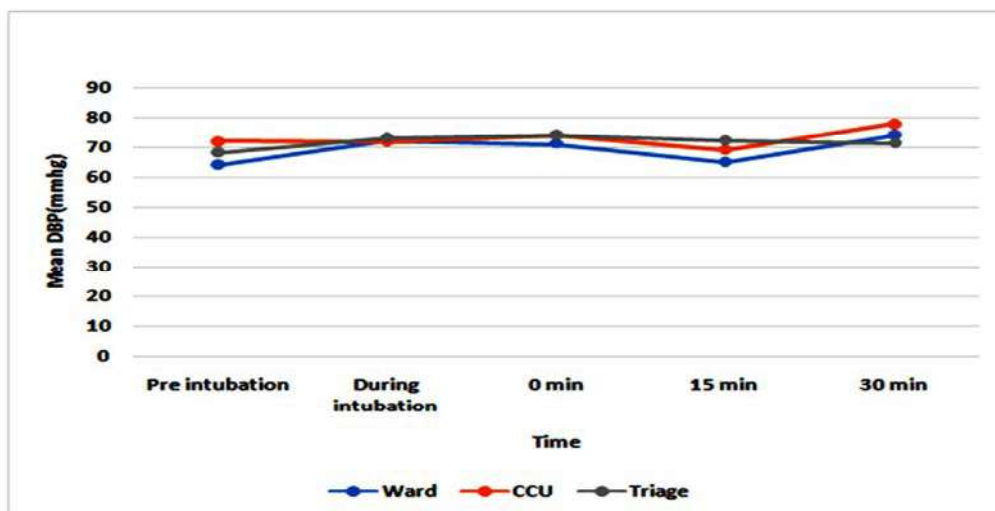
Total 90 (48.38%) patients survived to discharge from hospital. There was a trend of higher survival rate in the CCU [42 (67.74%)] as compared to General ward [16 (25.61%)] & Triage [32 (51.61%)]. Mortality rate was higher in General ward [46 (74.19%)] as compared to CCU [20 (32.26%)] & Triage [30 (48.39%)](p<0.001). Out of 90 (48.38%) patients discharged from hospital, 62 (38.33%) were discharged with CPC scores of 1 or 2, 16 (8.6%) with CPC score of 3, and 12 (6.2%) with scores of 4 or 5. In CCU, 33 (53.23%) patients were discharged from the hospital with CPC scores of 1 or 2, 06 (9.68%) with a score of 3, and 03 (4.84%) with scores of 4 or 5. In Triage 19 (30.63%) patients were discharged from the hospital with CPC scores of 1 or 2, 08 (12.9%) with a score of 3, and 05 (8.07%) with scores of 4 or 5, where as in General ward 10 (16.13%) patients were discharged from the hospital with CPC scores of 1 or 2, 02 (3.23%) with a score of 3, and 04 (6.45%) with scores of 4 or 5. In these different locations, we found that CCU had a higher rate of intact neurological survival to hospital discharge, as



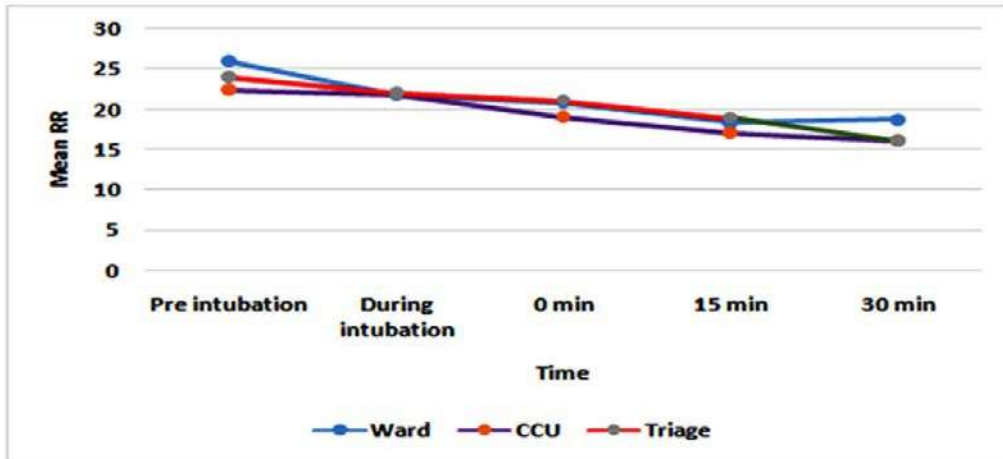
Graph 1: Comparison of mean heart rate



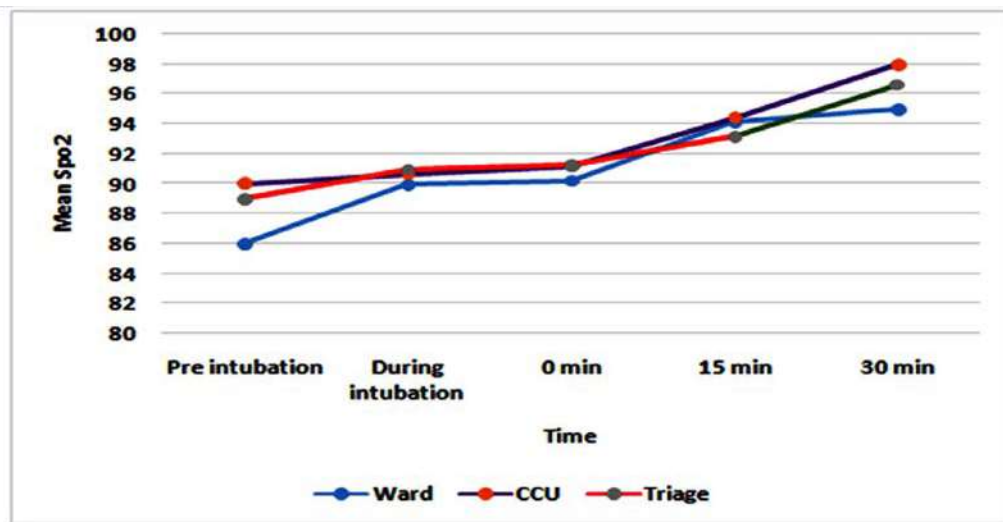
Graph 2: Comparison mean systolic blood pressure (mmHg)



Graph 3: Comparison of mean diastolic blood pressure (mmHg)



Graph 4: Comparison of Mean RR



Graph 5: Comparison of Mean SpO2

compared to General ward and Triage. ($p=0.0004$).

DISCUSSION

This is a novel study to compare the outcomes of emergency endotracheal intubation outside CCU.

In our study, patients intubated in CCU had a higher rate of survival to hospital discharge with a better neurological outcome than the General ward and Triage. Assessment of the risk factors for DET intubation, and early calls for the Anesthesiologist to conduct intubations, were possible contributing factors to a better outcome.⁴

It is evident from our data that patients who underwent Emergency endotracheal intubation outside CCU had higher mortality after their procedure. The likely reasons were delay in recognizing deterioration, lack of triage on first

contact leading to critical outcomes and delay in transport to CCU due to lack of a proper redressal system.

General ward had the highest proportion of difficult intubations [$n = 42$ (67.74%)], followed by Triage [$n = 39$ (62.9%)], and CCU [$n = 38$ (61.29%)]. It was observed that most patients in the General ward who had BMI $>25\text{kg/m}^2$, CL grade III & IV, or intubations performed in settings like poor lighting, limited space and suboptimal bed characteristics, limited the ability to properly position, led to difficult intubations.^{5,6} The higher mortality rate in General ward (74.19%) seemed to be associated with a higher CCI score. A shortage of experienced medical staff was a serious problem on the weekend.

Anesthetic agents &/or muscle relaxants are used highest in Triage, possibly due to acute injury