Original Research Article

Intubation in patients with restricted spine mobility - A clinical study

Gururaj Tanthry[1], DeepalakshmiTanthry[2*], Rahul R Nair[3]

[1]Associate professor and Consultant,[2]Assistant Professor and Consultant, [3]Junior Resident, Department of Anesthesiology, AJ Institute of Medical Sciences and Research Centre, Kuntikana, Mangalore – 575004 INDIA.
Email: deepalakshmitanthry@yahoo.com

Abstract

Tracheal intubation is necessary in patients with confirmed or suspected cervical spine instability. Patients are at risk in the laryngoscopic procedures following intubation. The severity of neurological sequel can be reduced when cervical injury is recognised early. The main aim in these patients is reduction of the movement of cervical spine during intubation. A prospective study was done in AJ Institute of Medical Sciences in this regard, taking into consideration the ease of intubation with simulated neck immobilisation using hard cervical collar. The demographic characteristics, clinical parameters, time taken for intubation, complications and the sequlae were evaluated and described.
Key Word: Intubation, Cervical spine immobility

[*]**Address for Correspondence:**
Dr. Deepalakshmi Tanthry, Assistant Professor and Consultant, Department of Anesthesiology, AJ Institute of Medical Sciences and Research Centre, Kuntikana, Mangalore – 575004 INDIA.
Email: deepalakshmitanthry@yahoo.com
Received Date: 10/02/2019 Revised Date: 13/03/2019 Accepted Date: 02/04/2019
DOI: https://doi.org/10.26611/10151029

Access this article online

Quick Response Code:

Website: www.medpulse.in

Accessed Date: 11 May 2019

INTRODUCTION

Patients with confirmed or suspected cervical spine instability may require tracheal intubation for a number of reasons, sometime in emergency circumstances. Laryngoscopy in these patients create a conflict between minimising cervical spine movement and allowing sufficient laryngeal visualisation to allow tracheal intubation. In routine anaesthetic practice, direct laryngoscopy involves extension of the head at the occipitoatlanto axial complex and flexion of the lower cervical vertebrae in order to align the oral, pharyngeal and the laryngeal axes and therefore allow intubation under direct vision. It is believed that patients with unstable cervical spines may be at risk during these manouveres and case reports exist that describe neurological deterioration following intubation, although the actual contribution of direct laryngoscopy to these injuries remain debatable and the overall risk has been estimated to be low. However there is evidence that the severity of neurological sequel may be reduced when cervical injury is recognised early and presumably more care is taken to minimise movement of cervical spine. Minimising cervical movement during laryngoscopy should therefore be a main aim in these patients.

AIMS AND OBJECTIVES

This prospective descriptive study was done on 60 patients aged between 18 – 50 years ASA grade I – II posted for elective surgeries under general anesthesia in A.J Hospital, Mangalore.

The steps in data collection were-

- Informed consent obtained from ASA I and ASA II patients.
- An appropriately sized rigid cervical collar placed as manufactuer's instruction.
- Measurement of the mouth opening before cervical collar application.
- A standard general anaesthesia and standard monitoring.

How to site this article: Gururaj Tanthry, DeepalakshmiTanthry, Rahul R Nair. Intubation in patients with restricted spine mobility - A clinical study. *MedPulse International Journal of Anesthesiology*. May 2019; 10(2): 112-114. http://medpulse.in/Anesthsiology/index.php

- Intubation was done with McIntosh or McCoy by anesthesiologist with adequate experience.
- Difficulty of insertion with the McCoy or the Mcintosh has been graded on Likert scale{ very difficult(-2), slightly difficult(-1), not difficult(0), easy(+1), very easy(+2)}. Intubation time was noted.
- The laryngoscopic views were graded with the Cormack Lehane grading I-IV

Most of the glottic opening can be seen with grade I. In grade 2, only the posterior portion of the glottis or only arytenoid cartilages are visible. In grade 3, only the epiglottis but no portion of the glottis is visible, whereas in grade 4, neither the glottis or the epiglottis can be seen.

- Episodes of failure of intubation were noted.
- Number of attempts were noted.
- Complications during intubation

INCLUSION CRITERIA

1. ASA I or II
2. Age between 18 and 50 yrs
3. Undergoing elective surgery

EXCLUSION CRITERIA

1. Mallampati grade III,IV
2. Mento-hyoid distance <3cm
3. Thyromental distance <5 cm
4. Sternomental distance <10cm
5. Neck circumference >42cm
6. Obesity(bodymassindex>30)

The Parameters considered were

1. Visualisation of the larynx
2. Time taken for intubation
3. Complications during intubation
4. Post operative complications

OBSERVATION AND RESULTS

The results were tabulated as follows

Table 1: Demographic characteristics of patients

Age	Number	Percentage
<20	5	8.3%
20 - 30	29	48.3%
31 - 40	11	18.3%
41 - 50	14	23.3%

Table 2: Clinical parameters of patients

Pulse rate(per minute)	77.32+/- 1.06
Average weight(in kgs)	56.41+/- 0.58
Average TMD (in cm)	6.4 +/- 0.04
Average SMP (in cm)	125 +/- 3.7
Average Diastolic BP	74.1 +/-3.63
SMD (cm)	12.55 +/-0.02
Average intubation time (in seconds)	35.18 +/- 9.4

CL grading I 44 II 16

DISCUSSION

The upper airway consists of pharynx and the nasal cavities, however some authors include the larynx and trachea as well. The pharynx is a u shaped fibromuscular tube that extends from the base of the skull to the cricoid cartilage. It is bounded anteriorly and superiorly by the nasal cavity followed more inferiorly by the mouth and then the larynx. The epiglottis guards the openings to the glottis or the glottic inlet. It is a flap of elastic cartilage covered by mucosa that is attached superiorly and anteriorly to the larynx. The cervical spine begins at the base of the skull. Its purpose is to contain and protect the spinal cord, support the skull and enable diverse head movement. Cervical spine mobility is based on Poissen effect. The spinal canal is divided into anterior, middle and posterior one third in which posterior one third space is available for spinal canal during extremes of neck movement. Poissen effect explains that if a column of a fixed volume is compressed its cross sectional area will increase and spinal cord is considered a fixed column. During extension the ligamentum flavum bulge is considered a cause for injury. During flexion, space can be narrowed due to posterior compression by osteophyte or intervertebral disc herniation. The most common mechanisms of cervical spine injury are hyperflexion, hyperextension and compression. The spinal cord injury can be due to direct trauma or due to secondary causes such as hypotension, blood flow obstruction, oxidative stress etc. Neck immobility, for now, manual in line stabilisation with cervical collar placement is considered as the only management of the cervical injury.Gerling *et al* movement across the cervical spine lesion using planes such as axial distraction, AP displacement and angular rotation using laryngoscopy[1]. The present study describes the difficulties in performing tracheal intubation in simulated cervical injury patients using hard collar device. S.C. Laurent *et al* conducted a study on patients with simulated cervical spine injuries, wherein the laryngoscopic view in 167 patients with their head and necks held in the neutral position with manual in line stabilisation and cricoid pressure to stimulate the patient with a suspected cervical spine injury. Difficult laryngoscopy defined as the inability to see the glottis was found in The time required for intubation is comparable with this study. The ease depended on the expertise of the anesthesiologist with direct laryngoscopy. The success of intubation was 100% in our study. D. Sethuraman *et al* conducted a randomised cross over study of the Dorges, McCoy and Macintosh laryngoscope blades in a stimulated difficult intubation scenario. The time taken to intubate, Cormack and Lehane scores, percentage of glottic opening visible, failure rate, number of attempts and subjective ease of use were recorded[(3)].

The time taken to intubate was 35.18 +/-9.4 seconds and was comparable to this study. In the study conducted by Yoshihiro *et al* it was emphasized that tracheal intubation in patients with suspected neck injuries should achieve two contraindicating goals – sufficient laryngeal exposure and the least cervical spine movement[4]. The number of attempts taken to intubate was almost similar to the study done by Nadkaarni M *et al*[5].None of the patient from Mccoy needed reattempt. In between the attempts patient was ventilated with 100% oxygen. In cases when the glottic view with the Macintosh blade was grade III the intubation had to be done with some manoeuveres (BURP), a device like bougie or a smaller number endotracheal tube. Airway trauma occurred during the process of intubation was also compared which was non significant. Similar study by Bharti *et al* in patients with immobilised cervical spine[6] showed mucosal trauma occurred in three patients.

CONCLUSION

Experience and skill is required to do endotracheal intubation in difficult scenario. Intubation is difficult in patients with suspected cervical spine injuries especially in emergency situations. Thorough knowledge is very crucial in handling such cases.

REFERENCES

1. Gerling M, Davis D, Hamilton R, Morris G *et al*, Effects of cervical spine immobilisation technique and laryngoscope blade selection on an unstable cervical spine in a cadaver model of intubation. Annals of Emergency Medicine, 2000;36(4):293-300.
2. Laurent SC, Melo AE, Alexander JM, The use of the McCoy laryngoscope in patients with simulated cervical spine injuries, Anesthesia,1996;51(1):74-5.
3. Sethuraman D, Darshane D, Guha A, Charters P, A randomised, crossover study of the Dorges, McCoy and Macintosh laryngoscope blades in a simulated difficult intubation, Anesthesia,2006,61(5):482-87.
4. Yoshihiro A, Inagawa G, Nakamura K, Sato H, Airway scope versus Macintosh laryngoscope in patients with simulated limitation of neck movements, Journal of Trauma and Acute Care surgery 69(4):2010: 838-42.
5. Nadkarni M, Patel RD, Behera P, Walzade A, Comparison of Mcintosh, Mccoy and Miller Laryngoscope blades for intubation A prospective randomised study,IOSR Journal of Dental and Medical Sciences,15(8).
6. Bharti N, Arora S, Panda N, A comparison of Mc Coy, Truview and Macintosh laryngoscopes for tracheal intubation in patients with immobilised cervical spine, Saudi J Anesthesiology,2014 Apr:8(2):188-92.

Source of Support: None Declared
Conflict of Interest: None Declared