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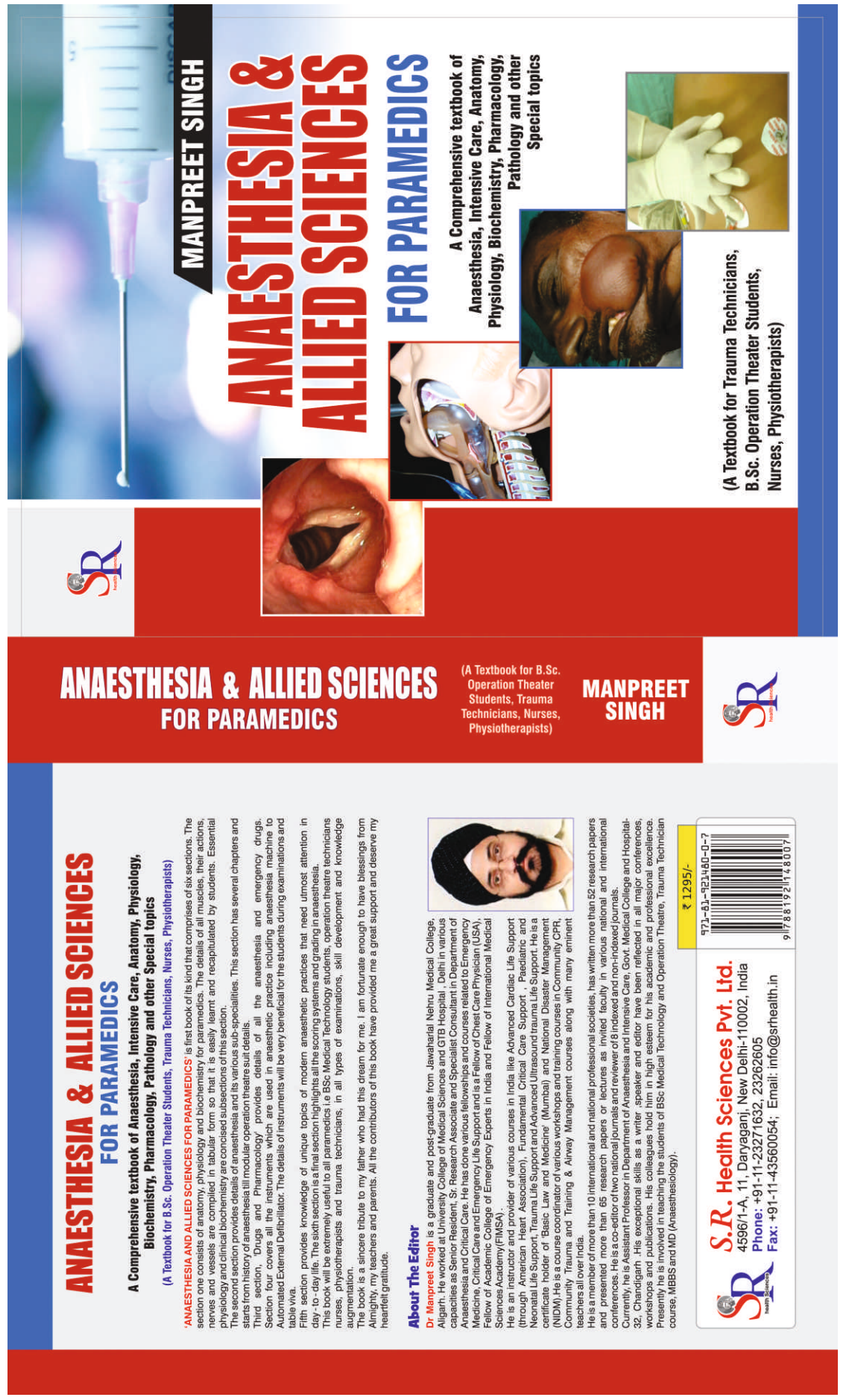

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LINGUAL TRACTION IN DIFFICULT FIBEROPTIC INTUBATION IN PAEDIATRIC POST BURN CONTRACTURE NECK : A RESCUE MANOEUVRE

Shahna Ali[1], Obaid.A. Siddiqui[2], Syed.M. Ahmed[3], Manazir Athar[4], Kashmiri Doley[5], Muazzam Hasan[6]

ABSTRACT

Airway management of paediatric patients with post burn contracture neck is a challenge for anaesthesiologists. Fiberoptic intubation under inhalational anaesthesia is an alternative to awake fiberoptic in paediatric population. However,airway loss following inhalational anaesthesia along with gross anatomical abnormality make even fiberoptic intubation difficult in such cases. Literature regarding effectiveness of rescue techniques like jaw thrust, lingual traction in paediatric patients with post burn contracture neck is limited. We concluded that lingual traction is an effective rescue manoeuvre in difficult fiberoptic intubation in paediatric patients with contracture face and neck.

Keywords: lingual traction ; paediatric patients; post burn contracture; fiberoptic intubation

INTRODUCTION

Post burn contracture of neck and face is one of the most common sequelae following acute burn of face and neck. Managing the airway of these patients has always been challenging to anaesthesiologists[1].The challenges are due the long standing contractures resulting in anatomical

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deformities specially limited mouth opening and fixed flexion deformity of neck.Awake fibreoptic intubation is considered to be the gold standard for management of airway in such cases [2]. However, awake fibreoptic intubation may not be possible in paediatric patients who lack in understanding and are usually uncooperative. Fibreoptic intubation under inhalational anaesthesia could be an alternative in these group of patients . Unconsciousness following inhalational anaesthetics can lead to loss of airway and difficulty in maintenance of airway. A number of rescue manoeuvres i.e jaw thrust, insertion of burmans airway, lingual traction etc, have been proposed to clear the airway (3,4). The relative effectiveness of these manoeuvres has not been extensively studied and reported in cases of difficult airway situations.

We report three pediatric cases who presented with severe contracture of neck and face with anticipated difficult airway in whom orotacheal fibreoptic intubation was difficult and jaw thrust and lingual traction were used as rescue manoeuvres.

CASE REPORT

Three patients admitted in our hospital over a period of months were posted for release and skin grafting of post burn contracture of neck. Two of them were male and one female, age ranging between 9–12 years. The post burn contractures involved face, neck, chest and upper arms.(Figure 1, 2 and 3)In the pre-anaesthetic check up clinic the patients were apprehensive. Vitals were stable and the patients were assigned ASA grade I. Airway examination revealed restricted mouth opening (Interincisor distance varying between 2 – 2.5 cm) and MP grade between III – IV.All the patients had fixed flexion deformity with severely restricted neck movements. The anterior part of the neck was not visible so the thyromental and sternomental distance could not be assessed. They were predicted to have difficult airway. Keeping in view the patients profile, fibreoptic orotracheal intubation under sevoflurane anaesthesia was planned.

Patient's relatives were explained and written inform consent was obtained.

Table 1: Patient Demographic and Airway Assessment Data

Case	Age(years)	ASA grade	BMI(kg/m2)	IID (cm)	MP grade
1	10	I	24.3	2.5	III
2	9	I	23.6	2.0	IV
3	12	I	21.6	2.5	III

MANAGEMENT OF THREE PATIENTS

Intravenous line was secured and the patients were premedicated with glycopyrrolate 0.2 mg i.v, ondansetron 4 mg i.v and midazolam 0.04 mg/kg. Local anesthesia of the airway was obtained with a combination of 10% lidocaine spray, gargle with 4% lidocaine and nebulisation with 4% lidocaine. Anesthesia was induced with sevoflurane (8%) and adequacy of bag mask ventilation was assessed after achieving adequate depth of anesthesia. Propofol 2 mg/kg and fentanyl 1mcg/kg was administered intravenously. Jaw thrust manouever was applied and bag mask ventilation was assessed. After adequate bag mask ventilation and with the maintained jaw thrust fibreoptic broncoscope with premounted endotracheal tube was advanced through the oral cavity. The anaesthesiologist was not able to negotiate the tip past the posterior part of the tongue. Fibreoptic broncoscope was then withdrawn and a burman's airway was inserted so as to negotiate the fibrescope through its side channel. Negotiation of the fibrescope through the burman's airway and visualisation of the vocal cord was not possible. Finally, a traction was applied on the tongue by manully grasping the tongue with a 4.4 guage and carefully lifting it anteriorly in vertical plane so that the lower incisors did not make contact with the tongue. After doing so the fibreoptic broncoscope could be easily advanced into the oropharynx past the soft palate and the glottis structures were visualized.The patients were intubated and the confirmation was done by chest auscultation and capnography.

DISCUSSION

Patients with post burn contracture usually present with difficult airway situations. Difficulty in maintaining a patent airway in these patients may lead to serious complications like hypercarbia and hypoxia [5,6]. Chronic facial and neck burns are often responsible for reduced mouth opening. These patients have fixed flexion deformity leading to severe restriction of neck movements which causes improper positioning thereby causing non alignment of the oral pharyngeal and laryngeal axis. The contracture of the muscles of the floor of the mouth lifts the tongue upward towards the hard palate and reduces the space in the oral cavity. It also makes the submandibular space non compliant and does not allow the tongue to be depressed with laryngoscope blade and make room in the oral cavity. These factors when combined together lead to limited availability of airway management options in patients of post burn contracture [7].

The most prudent approach therefore is awake fibreoptic intubation which is considered to be the gold standard in anticipated difficult airway situations. However we did not plan for awake intubation because of a number of reasons. Awake intubation in paediatric patient is a very distressing and painful procedure and patients are usually very apprehensive and uncooperative during the procedure [8]. Psychological preparation and counselling paediatric patient is a herculean task. Moreover achieving local anesthesia is difficult due to anatomical abnormalities of the face and neck. The need for general anesthesia in pediatric patients therefore becomes necessary[9]. In all the three patients the application of jaw thrust did not clear the airway and the anaesthesiologist was not able to negotiate the tip of the fiberscope past the upper airway, while in all the three cases lingual traction was effective in opening the airway and the fibrescope was advanced past the upper airway. This could be probably due to the following reasons:

During general anaesthesia the strap muscles of the neck are relaxed causing the mandible to fall back. As a consequence the tongue which is attached to the floor of the mouth and the mandible falls back on the posterior pharyngeal wall obstructing the airway passage.Normally the application of jaw thrust pulls the mandible upward and forward thereby making the airway patent [4].

In our series three major problems were identified. All the three cases had a history of long standing post burn contracture neck with fixed flexion deformity. The mentum was almost attached to the sternum reducing the sternomental distance to zero and thyromental distance not measurable. The submandibular space was rigid and non compliant. Both of these anatomical changes probably led to an imbalance between the growth of the bony mandible and soft tissue tongue over a period of time. As a result the tongue was larger in size in comparison to the space in the oral cavity. In addition to these changes, the fixed flexion deformity of the neck did not permit proper application of jaw thrust. The jaw could be slightly lifted up but could not be protruded forward. The restricted forward movement of jaw probably led to the opposition of the tongue towards the hard palate, obliterating the oral passage and making

the negotiation of fibrescope impossible. We tried to negotiate the fibrescope through the burman's airway but the application of jaw thrust displaced the airway and made negotiation of the fibrescope more difficult. Finally, we pulled the tongue out of the oral cavity. This helped in making adequate space between the tongue and the hard palate and also in lifting the epiglottis which is attached to the tongue through the aryepiglottic fold.The fibrescope could then be passed through oral and pharyngeal space and visualize the larynx. The application of the lingual traction was effective in pulling the tongue away from the soft and hard palate. Although these manouevers have been described in cases of difficult fibreoptic broncoscopy there is scarcity of literature on the relative effectiveness of these techniques in opening the airway in paediatric patients with difficult airway due to post burn contracture.

This case report therefore highlights the effectiveness of tongue traction in opening the airway as compared to application of jaw thrust and insertion of burman's airway in cases of post burn contracture in paediatric patients under general anaesthesia. However we are of the opinion that more case based studies and trial may be required to effectively prove this.

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AIRWAY MANAGEMENT IN A SEVERE BURN CONTRACTURE NECK WITH FIXED FLEXION DEFORMITY USING BONFILS INTUBATION FIBERSCOPE SCOPE

Gupta Anju[1], Gupta Nishkarsh[2]

INTRODUCTION

Airway management in reconstructive surgeries in patients with burn contractures of head and neck, can be challenging for anesthetists. Patients with burn contracture may have a reduced mouth opening, restricted neck movements, decreased oropharyngeal space and a reduced submandibular compliance, making airway management difficult.[1]So , most prudent approach to secure airway and maintain airway patency in a case of severe burn contracture neck is by one of the awake techniques. Though numerous gadgets have been used for awake intubation in a particular situation, but decision to adopt a technique depends local available resources, anesthetist familiarity and skill with that particular technique; patient factors e.g. need for nasal/oral cooperation, tumors, presence of secretions and blood in the airway. Bonfils intubation fiberscope (BIF) is increasingly being used as an important adjunct in difficult airway situation.[2,3]It is highly versatile instrument and has been used in a variety of difficult airway situations such as airway tumors, unstable/fixed cervical spine.[4,5] Awake intubation with BIF ay not as difficult as one might suspect.[6] Bonfill's guided awake intubation can be performed with minimal topicalisation as compared to using flexible fiberscope guided nasal intubation is well tolerated with high success rate.[6] We report a case of severe burn contracture neck , successfully intubated awake with Bonfill's retromolar scope. This is for the first time that use of awakebonfill's scope has been demonstrated for managing airway of a patient with severe burn contracture neck.

CASE REPORT

A 48 year old, ASA I, male with severe burn contracture neck presented to our hospital for release of contracture and skin grafting. He did not have any comorbidity, his biochemical investigations; CXR and ECG were within normal limits. Airway examination revealed a restricted mouth opening (1.8cm), a mallampatti class could not be assessed (limited mouth opening), fixed flexion deformity with markedly restricted neck movements and reduced submandibular compliance (due to scar). The patient was posted for release of contracture and grafting. Surgeons and the patient were explained about the intubation difficulty, possible need for surgical airway management (plan D), contracture release under local anesthesia and possibility of

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rescheduling of case in case of failure to secure the airway. Since, it was a predicted difficult intubation, fiberoptic bronchoscope (FOB) guided intubation was our first choice but unfortunately the only FOB in the department was not working. So, we decided to do an awake BIF guided awake intubation (Plan A) and the patient's consent was taken. Hence, we planned to do a BIF guided intubation In case of failure of plan A, LMA proseal and ILMA guided intubation were kept as our Plan B and C.

The patient was fasted for 8 hours preoperatively and given ranitidine 150mg and alprazolam 0.25 mg tablets night before and on the morning of surgery with a sip of water. Patient was explained about the awake intubation procedure. Patient was given injection glycopyrrolate 0.2 mg IM 45 minutes before the planned procedure and his airway was nebulized with 4 mlof 4% lignocaine. Patient was also made to gargle with 4% lignocaine viscous.

In the operating room standard monitors including continuous 5 lead electrocardiogram, noninvasive blood pressure and pulse oximetry were attached. A difficult airway cart comprising of oral airway, nasal airway, facemasks, LMA classic, LMA proseal, ILMA with introducer and tube, i-gel,BIF, bougie and different sizes of ETT was arranged. A 20 G IV cannula was established in the left hand and injection midazolam 1 mg and injection fentanyl 50 ug were given intravenously. A size 7.0-cuffed ETT was mounted on the BIF with oxygen insufflation @3L/minute. Bonfill's was inserted paraglossally and as soon as the glottis was visualized 4 ml 2% lignocaine was sprayed over the cords. After waiting for 45 seconds, the scope was introduced further and 4ml of 2% lignocaine was again instilled into trachea. Now, the glottis view was centralized and ETT # 7.5 was threaded over the scope into the trachea with the help of an assistant. After confirming the correct placement of ETT by

Figure 1: patient with severe burn contracture

auscultation and $EtCO_2$ tracing, anesthesia was induced and vecuronium bromide (0.4 mg/kg) was given. Anesthesia was maintained with sevoflurane (2-3%) in N_2O and O_2 (66:33). The procedure could be completed uneventfully. In the end, the trachea was extubated after reversing neuromuscular block and shifted to ICU for monitoring. The patient was comfortable and discharged from ICU the next day.

DISCUSSION

The airway management in a patient with burn contracture neck can be challenge for every anesthetist. Our patient had predicted difficult airway due to reduced mouth opening (oral cavity), a mallampatti that could not be assessed (reduced oropharyngeal space), a reduced and less compliant submandibular space and markedly reduced neck movements (fixed flexion movement) and scarred neck making it difficult to assess neck distances. Moreover, due to excessive scaring of the face, mask ventilation was also thought to be difficult.

A number of airway devices are available to us today to manage a difficult airway scenario.[1] Awake fiberoptic intubation is regarded as a gold standard to manage recognized difficult airway.[7] However, various factors such as availability, lack of expertise and patient cooperation may limit its usefulness.

In the present case report the airway assessment parameters suggested the need of an awake

intubation but the only flexible FOB in the department was nonfunctional so, awake BIF guided intubation was planned. Other alternative plans were LMA proseal (Plan B), ILMA (Plan C) or tracheostomy (Plan D). PLMA was not considered as the first choice because of distorted anatomy and anticipated neck movements during the procedure. We could have used ILMA but we were not sure of intubation through it because of fixed flexion deformity. Our In case of failure, the surgeons were told to be ready for scar release under local anesthesia and /or tracheostomy if required, if we had failed with our primary and secondary plans.

In our patient, the blocks to anesthetize the airway could not be given because of extensive scarring of the neck. So, we had prepared the airway with nebulization with lignocaine and gargles.

Adult size Bonfills is 40 cm rigid fibreoptic stylet with an external diameter of 5mm and 40degrees anteriorly curved tip and can accommodate ETT > 6.5 mm. Though it has a shallow learning curve, after initial training, success rate is very high in normal and difficult airway (90%). Recently there are many reports suggesting its usefulness to intubate patients with normal and difficult airways (expected or unexpected).[2,3,4] It has been successfully used in patients with reduced neck mobility, decreased mouth opening (7 mm) and patients with unstable cervical spine.[5,6,8] It has also been used for awake intubation in predicted DA.[6,9] Its rigid anatomy allows for better translation of hand movements and gentle pushing away of obstructing structures. Since larynx can be visualized with less distraction forces on the airway tissues, awake intubation may be easier to perform.[2,3] Moreover, since there is no leading edge beyond the optic view, soft tissue injury and subsequent hoarseness, sorethroat and respiratory morbidities are minimum.[2,3]

Since ETT is already preloaded on Bonfill's, it followed the direction of BIF when being railroaded off. Our patient had reduced mouth opening (1.8 cm) and a limited neck extension. Since, we had used BIF for awake intubation earlier at our centre, we decided to keep awake BIF guided intubation as our primary plan.

Extensive scarring and contractures in burn patient may distort the upper airway anatomy and make mask ventilation and intubation difficult.[10] Even rescue measures like retrograde intubation and tracheostomy may be difficult in experienced hands.

Present report highlights the potential utility of BIF for awake intubation in anticipated DA scenarios. BIF should be considered for intubating anticipated difficult airway. A thorough preoperative airway assessment, meticulous planning, airway equipment's availability and surgeons support in case of emergency can go a long way in managing such patients and preventing adverse events.

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COMPARISON OF INTUBATING CONDITION AFTER ROCURONIUM BROMIDE AND SUCCINYLCHOLINE

Leena Patel[1], Jayshree Thakkar[2], Nikul Prajapati[3], Vijeta Tandel[4], Abhisek Bhardwaj[4],B M Patel[5]

SUMMARY:

BACKGROUND: Rapid and safe endotracheal intubation is the principal aim in practice of general anaesthesia. Succinylcholine chloride, a depolarizing muscle relaxant because of its quick onset of action with good jaw and diaphragmatic relaxation gives excellent intubating condition and hence is a drug of choice for intubation. But because of its side effects there is a need to search a safer alternate for intubation.

AIM: Present study was undertaken to evaluate the intubating conditions with rocuronium bromide and compare that with succinylcholine and observe side effects of both the drugs.

MATERIAL METHOD : Sixty patients selected and divided in to three groups with 20 patients in each group. Group-I patients received succinylcholine chloride 1.5mg/kg IV and intubated at 60 seconds, group-II patients received 0.6mg/kg IV rocuronium bromide and intubated at 60 seconds, group -III patients received 0.6mg/kg rocuronium bromide IV and intubated at 90 seconds. Intubating conditions were observed and compared in all three groups. Onset time and duration of action were noted. Hemodynamic parameters were monitored at fixed time interval. **Results** : Mean onset time and duration of action was significantly longer for rocuronium (72.25±12.84 seconds, 27.31±8.32minutes) respectively in group II and (74.20 ± 10.30 seconds, 25.40 ± 7.42minutes) in group III than that of succinylcholine (47.5±12.95 seconds, 6.65±1.23minutes). Intubating conditions were excellent in all patients (100%) in succinylcholine group where as it was excellent in 15 (75%) patients in group II and in 18 (90%) patients in group III. Good intubation conditions were observed in 5 (25%) patients in group III and in 2 (10%) patients in group III.

CONCLUSION: Rocuronium can be used as an alternative to succinylcholine for endotracheal intubation when no predicted difficult intubation and where succinylcholine is contraindicated.

KEY WORDS: Intubation, Rocuronium, Succinylcholine, Muscle relaxant

SHORT TITLE: Comparison of succinylcholine and rocuronium for tracheal intubation.

INTRODUCTION

Endotrachel intubation is necessary for administration of general anaesthesia, to maintain airway and to prevent aspiration. Vital period for aspiration is interval between suppression of protective reflexes and development of satisfactory intubating condition which requires

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relaxation of laryngeal musculature and total inactivity of vocal cords. So the time interval between drug administration to relaxation of larynx should be as short as possible.

Succinylcholine is depolarising neuromuscular blocking agent having very rapid onset of action and ultra short duration of action.[1] It is rapidly hydrolysed by pseudocholinesterase. Only small amount of drug reaches at neuromuscular junction after intravenous dose. It is still a relaxant of choice for planned and emergency surgery but it is not free of side effects like fasciculation, hyperkalemia, raised intra cranial pressure, raised intra ocular pressure, bradycardia, post operate myalgia and incidence of prolonged recovery in patient with pseudocholinesterase deficiency. Most of the side effects are due to its depolarising mechanism of action. Therefore there is a need to search an agent, which has rapid onset of action, short duration of action, excellent intubating condition and without the side effects seen with succinylcholine preferably non depolarising type. Recently developed nondepolarising agents are free from such side effects. Rocuronium is a non depolarizing vecuronium derivative drug with intermediate duration of action.[2] It is an amino steroid compound. It competes with acetylcholine for binding with nicotinergic receptor at motor end plate (Miller as newer edition). Several studies have proved its rapid onset of action and good intubating condition without the side effects of succinylcholine.[3,4,5]

In 1992,R Copper R K Mirakhur had assessed intubating conditions after administration of rocuronium 0.6mg/kg at 60 seconds and 90 seconds and compared it with succinylcholine.[6] Intubating conditions were found acceptable in 95% of patients at 60 seconds and in all patient at 90 seconds in rocuronium group and in all patients at both times after succinylcholine.

Rocuronium bromide had shorter onset time, provides good intubating condition and is without the side effects of succinylcholine.[7] In many studies rocuronium was used in the dose of 0.6mg/kg which is ED95x2. ED95 is required dose to produce 95% depression of twitch response of the thumb on single twitch stimulation. Usually twice the ED95 dose of non depolarizer is required for intubation.[3,6,5] With intubating dose of rocuronium in ED95x2 onset of action is 83±33 seconds and with ED95x3 dose onset is equal to that of succinylcholine 55±14 seconds.[2]

AIMS AND OBJECTIVES

Our aim for present study is to compare intubating conditions provided by succinylcholine and rocuronium bromide, onset of action, duration of action, hemodynamic changes and side effects of both the drugs.

We excluded patients having anticipated difficult intubation, neuromuscular disorder, body weight >20% of ideal body weight, metabolic disease, renal or hepatic impairment, allergy to any study drug, and taking medications known to alter neuromuscular transmission.

MATERIAL AND METHOD

After taking informed consent and institutional approval, 60 adult patients of ASA grade I and II aged between 16-60 years undergoing various elective surgeries requiring oral intubation were selected for study. Patients were equally divided into three groups in a randomized double blind fashion. Group I patients were given succinylcholine chlorine 1.5mg/kg IV and were intubated at 60 seconds, group II patients were given Inj rocuronium bromide 0.6mg/kg IV and were intubated at 60 seconds, group III patients were given inj. rocuronium bromide 0.6mg/kg IV and intubated at 90 seconds.

All patients underwent thorough preanaesthetic check up to assess the medical and physical fitness. All the patients had received tab

lorazepam 1mg at the night before surgery and tab diazepam 0.1mg/kg in the morning. On arrival to operating room an IV line was secured and the monitor was set up to monitor heart rate, ECG (electrocardiogram) ,NIBP (non invasive blood pressure), SpO_2. Effect of muscle relaxant was monitored by peripheral nerve stimulator to monitor onset and duration of both drugs. Two surface electrodes of peripheral nerve stimulator were placed over the site of ulnar nerve at medial side of wrist near proximal crease.

Patients were premedicated with inj. glycopyrrolate, inj. fentanyl citrate 2mcg/kg IV 5 minutes before induction. After preoxygenation for 3minutes,anaesthesia was induced with inj. thiopentone sodium 5mg/kg IV Before administration of muscle relaxant, the supra maximal stimulus was determined with the help of peripheral nerve stimulation by observing contraction of adductor pollices by visual and tactile assessment. Muscle relaxant, according to the group, was given in fast running IV line. Ventilation was assisted with a facemask and 100% oxygen manually. After injection of muscle relaxant, four successive stimuli of train of four were given at 2HZ. The four twitches of the adductor pollices muscle were observed visually. The stimulus was gen every 10 seconds till the loss of all four twitches. The time interval between end of injection to the loss of all four twitches was considered as onset time.

Endotracheal intubation was performed by an experienced anaesthesiologist unaware of muscle relaxant used. The endotracheal intubation was done with portex endotracheal tube of appropriate size at a fixed time that is 60 seconds in group I and II and at 90 seconds in group III. The intubating conditions were assessed according to four point scale of copper et al(1992).[6] Each variable of Cooper's scoring system was graded on four point scale (0-3) and gen a score as (table-1) and total score was obtained by adding them. This total score was considered to grade intubating conditions (table-2). An intubation score of 8-9 was considered as excellent, 6-7 as good, 3-5 as poor and 0-2 as bad. Good to excellent intubation scores were taken as clinically acceptable intubating condition.

Table- 1 Scoring of intubating condition

Score	Jaw Relaxation	Vocal Cords	Response to Intubation
0	Poor (possible)	Closed	Severe coughing or bucking
1	Minimal(difficult)	Closing	Mild coughing
2	Moderate (fair)	Moving	Slight diaphragmatic movement
3	Good (easy)	Open	None

Table-2 Grading of intubation

Intubating Condition	Score
Excellent	8-9
Good	6-7
Fair	3-5
Poor	0-2

The vital parameter like heart rate, systolic blood pressure, diastolic blood pressure were recorded at fixed time interval i.e. before induction, after induction, and immediately after intubation at 1 min, 5min, 10min and then every 10 min till end of surgery and in immediate post operate period. Train of four stimuli was given every 5 min till the recovery of first twitch response. Time from injection of muscle relaxant to the recovery of first twitch response was taken as duration of action. This was followed by supplementation of inj. vecuronium bromide. The patients were observed for various side effects of succinylcholine and rocuronium bromide like muscle fasciculations, bradycardia (< 30% of baseline), tachycardia(> 30% of baseline), hypertension (> 30% of baseline), anaphylactic reaction, rash, bronchospasm etc.

At the completion of surgery neuromuscular block was reversed with inj glycopyrrolate 8mcg/kg , inj neostigmine 50mcg/kg . Patients were extubated when fully awake and fulfilled the criteria for extubation.

Statistical analysis: At the end of study data were analyzed as mean and SD with the help of software version SPSS 17 (Chicago, IL, USA). Student 't' test was done to assess the quantitative parameters between the groups and chi-square test used to assess qualitative parameter between the two groups. A P value <0.05 was considered as statistically significant.

Results

Sixty patients were equally divided in three group. Demographic data were comparable in all the groups as shown in Table-3 in context to age, weight and sex ratio. Table- 4 shows onset time and duration of action of succinylcholine and rocuronium bromide. The mean onset time of succinylcholine was 47.5± 12.95 seconds and of rocuronium bromide was 72.25 ± 12.84 seconds in group II and 74.20 ± 10.32 seconds in group III. The difference was statistically significant between group I and group II (P<0.0001) and between group I and group III (0.0001).

The mean duration of action of succinylcholine was 6.65 ± 1.23 minutes and for rocuronium bromide it was 27.31 ± 8.32 minutes in group II and 25.40 ± 7.42minutes in group III. The difference was statistically significant between group I and group II (P<0.0001) and between group I and group III (P<0.0001).

As shown in table 5 intubating conditions were excellent in 100%, of patients in Group-I, 75% of patients in Group-II and 90% of patients in group-III. Intubating conditions were good in 25% of patients in Group-II and 10% in group III. The excellent and good intubating conditions were considered acceptable. In our study acceptable condition were found in 100% of patients. None of our patients required multiple attempts of intubation.

Table-3 Demographic Data (mean +/- sd)

Variables	Group-I	Group-II	Group-III
Age(yrs)	48.1 ± 8.09	49.35 ± 10.07	48.85 ± 8.75
Weight(kgs)	49.15 ± 6.67	52.05 ± 8.75	48.45 ± 6.79
Sex(M:F)	9:11	11:9	9:11

Table-4 Onset time and duration of action

Variables	Group-1 (n=20)	Group-2 (n=20)	Group-3 (n=20)	P Value Group I & II	P Value Group II & III	P Value Group III & I
Onset of action(seconds)	47.5±12.95	72.25 ± 12.84	74.20± 10.32	<0.0001	0.5811	0.0001
Duration of action(minutes)	6.65± 1.23	27.31 ± 8.32	25.40 ± 7.42	<0.0001	0.4483	0.0001

Data are expressed as mean+/-sd. P value <0.05 considered as significant.

Table-5 Intubating conditions

variables	Group-I(n=20)		Group-II(n=20)		Group-III(n=20)	
Intubating condition	No. of Patients	%	No. of patients	%	No. of patients	%
Excellent	20	100%	15	75%	18	90%
Good	-	-	5	25%	2	10%
Fair	-	-	-	-	-	-
Poor	-	-	-	-	-	-

The heart rate increased significantly in all groups immediately after intubation which gradually reached to baseline values(Table 6). Similarly as in table 7 and 8 systolic as well as diastolic blood pressure increased immediately after intubation in all groups which reached to baseline value within 10 minutes. Muscle fasciculations were seen in 15 (80%) of patients in group-I. No other significant side effects were observed during laryngoscopy and intubation in any group.