



## A CLINICAL COMPARATIVE STUDY OF TWO INTUBATING DOSES OF CIS-ATRACURIUM DURING GENERAL ANAESTHESIA FOR RENAL TRANSPLANT SURGERIES.

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### ABSTRACT

**Introduction:** Cisatracurium unlike atracurium is devoid of histamine-induced cardiovascular effects and this alone would be the greatest advantage in replacing atracurium for the facilitation of tracheal intubation. On the other hand, 2xED95 dose of cisatracurium (100micro/kg) do not yield satisfactory intubating conditions such as those seen with equipotent doses atracurium and therefore there commended intubating dose of cisatracurium is 3xED95 . To understand better, we evaluated intubating condition with diferent doses of cisatracurium in renal transplant surgery.

**Aims & objectives:** To evaluate and compare the intubating condition, duration of action, hemodynamic effects for different doses of cisatracurium.

**Material & methods:** After informed patient's consent 60 patients in age group of 20-50 years were selected and included in the study. Patients were divided in two groups of 30 each, GROUP-A received intravenously 2xED95 (0.1mg/kg) dose of cisatracurium and GROUP-B received intravenously 3xED95 (0.15mg/kg) during induction.

**Results:** Better intubating condition, hemodynamic stability and longer duration of action was found with 0.15mg/kg dose of Cisatracurium than 0.1mg/kg Cisatracurium in a induction .

**KEYWORDS :** atracurium, cisatracurium, muscle relaxants and renal transplant.

### INTRODUCTION:

Muscle relaxants are rapidly became a routine part of the anaesthesiologist's drug arsenal. Cisatracurium is an intermediate duration , nondepolarising Neuromuscular blocking drug which is devoid of histamine-induced cardiovascular effects. 2ED<sub>95</sub> doses of cisatracurium (100 µ g/kg) do not create satisfactory intubating conditions such as those seen with equipotent doses of atracurium. The recommended intubating dose of cisatracurium is 3xED<sub>95</sub>. To understand this discrepancy better, we evaluated the potency and onset of two dose of cisatracurium.<sup>[4]</sup>

**AIMS & OBJECTIVES:** This study was designed to compare different doses of cisatracurium (2xED<sub>95</sub>, 3xED<sub>95</sub>) regarding the Condition of intubation, duration of action and hemodynamic effects.

### MATERIALS & METHOD:

The study was carried out as a randomized, comparative clinical trial after Ethical committee approval and patients consent on a 60 patients of both sexes , ASA grade III/IV undergoing Renal Transplantation. Patients were divided in two groups. In Group-A 30 patients received cisatracurium of 0.1 mg/kg (2xED<sub>95</sub>) and in Group-B 30 patients received cisatracurium 0.15 mg/kg (3xED<sub>95</sub>) in Induction.

Patients with disorder of the cardiovascular, hepatic or neuromuscular systems, Patients in whom difficult intubation was expected ,Patients on medication known to interact with neuromuscular blocking agents were excluded from the study. Pre-anesthetic examination was carried out with general examinations ,Systemic examination, Airway assessment. All baseline investigations - CBC, RFT, LFT, Urine R/M, Coagulation profile, RBS, ECG, X-ray chest, USG-abdomen, 2D Echo, Funds examination. Pre operative heamodialysis was advised for all patients and Post dialysis investigations were done including CBC, S.cr, .S.electrolytes, Coagulation profile, ECG, Chest x-ray. In all patients I.V. line was secured with a 18G i.v cannula. ASA standard monitors-ECG, NIBP, SPO2 were attached and baseline parameters like BP,MAP,HR,SPO2 were noted.

Patients were Pre-medicated with Inj. Ondansetron 0.1mg/kg & inj glycopyrolate 0.04mg/kg, inj.fentanyl 2mcg/kg. For neuromuscular monitoring, "PERIPHERAL NERVE STIMULATOR" was applied. Electrodes of PNS were applied along the course of the ulnar nerve

on forearm and acceleration transducer was attached to thumb. Induction was done with inj.thiopentone sodium(5-7 mg/kg), cisatracurium given IV according to the previously mentioned initial doses for each group , After completion of injection NDMR, supra maximal stimuli of 1Hz for 0.2 ms at every 12 seconds intervals were given and obtained twitch height(TW)% were noted. The onset time was determined as the interval from the end of muscle relaxant injection until there was twitch height less than 5%, endotracheal intubation was done. using proper size of oral cuff endotracheal tube, Etco2 was attached and following observations were noted.

- Excellent: Easy passage of the tube without coughing. Vocal cords relaxed and abducted.
- Good: Passage of the tube with slight coughing and/or bucking. Vocal cords relaxed and abducted.
- Poor: Passage of tubes with moderate coughing and/or bucking vocal cords moderately adducted.
- Not possible: Vocal cords not relaxed, tightly adducted.

The onset of time and the duration of the muscle relaxant (time from the end of injection of the drug until 25% recovery of T<sub>1</sub>%) were recorded. Patients were monitored for any hemodynamic changes or bronchospasm. hemodynamic changes including: heart rate (HR), mean arterial blood pressure (MABP) every 5 min to 15 min, oxygen saturation (SO<sub>2</sub>), and end tidal CO<sub>2</sub> noted, intraoperatively maintainance was done with O<sub>2</sub>+N<sub>2</sub>O(50:50) and isoflurane. At the end of operation -reversal (induced recovery) by administration of neostigmine and glycopyrrolate mixture through slow IV injection.

### STATISTICAL METHODS:

The sample size was calculated on the basis of heart rate (HR), mean arterial blood pressure (MABP) every 5 min to 15 min using IBM@SPSS@ statistics version 20. Data are represented as mean ± SD. The baseline variables were compared between the two groups using Student's t-test for independent variables and nominal data were calculated using Chi-square test.

### RESULTS

#### Demographic data :

The studied patients were matched regarding age and sex with no statistically significant difference being recorded.

**TABLE – 1 Demographic data.**

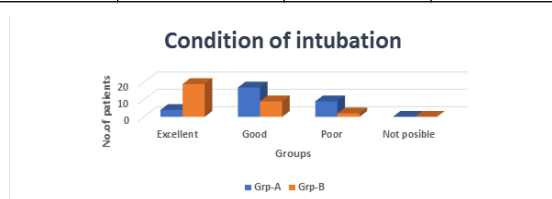
	Grp-A (N=30) [0.1MG/KG]	Grp-B (N=30) [0.15MG/KG]	p-value
Age ( in years)	32.53±6.63	35.30±7.94	0.15 (NS)
Weight	51.70±3.86	54.23±3.82	0.19 (NS)
Sex : M	15	17	0.16 (NS)
F	15	13	

**INTUBATING CONDITIONS:**

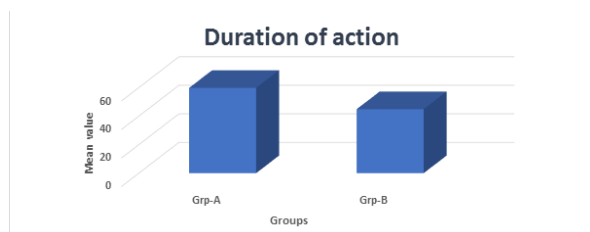
Excellent to good intubating conditions could be achieved in group B (excellent-63%, good-30%, poor-2%) than group A (excellent-13%, good-56%, poor-9%).

**TABLE .2 :Intubating conditions.**

	Grp-A (N=30)	Grp-B (N=30)	p-value
Excellent	4 (13.3%)	19 (63.33%)	<0.01*
Good	17 (56.66%)	9 (30%)	0.04*
Poor	9 (30%)	2 (6.66%)	0.02*
Not possible	0 (0%)	0 (0%)	-

**DURATION OF ACTION:**

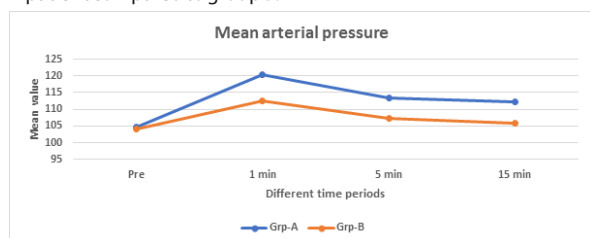
	Grp-A (N=30)	Grp-B (N=30)	p-value
Duration of action (Mins)	44.87±1.63	59.80±2.14	<0.01*

**TABLE 3:** Duration of action

With 3×ED95 dose of cisatracurium duration of action was significantly longer (59 minutes versus 44 minutes) than lower doses of cisatracurium and the atracurium (2×ED95).

**HAEMODYNAMIC CHANGES:**

There was statistical significantly increase in HR, MABP post intubation when compared to baseline and post induction in group A patient compared to group B.

**DISCUSSION:**

Chronic renal failure is a consequence of irreversible renal function degeneration. The poor kidney excretion, metabolic and endocrine function leads to uremic syndrome characterised by several systemic changes, especially metabolic, neurological and muscular. In patients with progressive renal tissue destruction, dialysis and renal transplantation are indicated to reestablish renal function. General anaesthesia is the most widely used anaesthesia technique for renal transplantation. Neuromuscular blockers are part of general anaesthesia and are necessary to assure muscle relaxation needed

for tracheal intubation, assisted ventilation and surgical field facilitation.[1]

In patients with End Stage Renal Disease, the use of many drugs poses problems in view of the reliance of most drugs on the kidney for final elimination. The neuromuscular blocking agents are no exception. The NDMRs in a common clinical use are all eliminated to some degree by kidney and it is usually suggested that it is for this reason that their use in patients with renal failure is associated with the risk of persistent curarization or even recrurization in a postoperative period.[2]

Cisatracurium, the 1R cis-isomer of Atracurium, is subject to Hoffmann degradation and Ester hydrolysis, albeit to differing degrees. As it is more potent, the plasma concentrations of laudanosine and histamine are lower than equipotent dose of Atracurium.[3]

The adequacy of conditions for tracheal intubation is a function of several factors, such as the depth of anaesthesia at the time of the intubation attempt and the level of neuromuscular block at the time of attempt.

we observed Excellent to good intubating conditions achieved in patients received 0.15mg/kg cisatracurium than 0.1mg/kg. Hence the minimum dose required to achieve excellent to good intubating conditions with cisatracurium is 0.15 mg/kg at 2mins after its administration. 3×ED95 dose of cisatracurium - significantly better than 2×ED95 dose of cisatracurium. One of two intubating doses of cisatracurium may be chosen based on the desired time of intubation and the anticipated length of surgery. The cisatracurium dose of 0.15 mg/kg (3×ED95) is higher than the dose of atracurium 0.5 mg/kg (2×ED95) required to produce clinically acceptable intubation conditions after 120 s.

EL-KASABY, et al. Found that the same dose (2XED 95 dose) atracurium is more effective NMB agent than cisatracurium, while higher doses of cisatracurium 4XED 95 and 6XED 95 provide more effective neuromuscular blocking effect than 2×ED95.

Hemodynamic stability for both HR and mean MABP was more evident among higher doses of cisatracurium (3×ED95). There was Statistically significant increase in HR, MABP post intubation 120 s post injection of the muscle relaxant when compared to baseline than post- injection of 2×ED95 dose of cisatracurium in group A because of stress response of intubation. PRAKASH JAMMAR, et al showed in his study that 0.15 mg/kg induction dose of Cisatracurium provides more haemodynamic stability than 0.1mg/kg Cisatracurium.[4]

In our study group-B received 3×ED95 dose of cisatracurium had statistically significant longer duration of action than lower doses of cisatracurium (2×ED95).

Similarly EL-KASABY and PRAKASH JAMMAR found the same results in their study. [4,5]

**CONCLUSION:**

3×ED95 dose (0.15mg/kg) of cis-atracurium provides better intubating condition, Longer duration of action, More stable hemodynamic status Than 2×ED95 (0.1mg/kg) dose of cis-atracurium.

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