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A Comparative Study of Attenuation of Stress Response to Intubation for Intracranial Surgeries with Labetalol, Nitroglycerine and Xylocard

KEYWORDS: Pulse rate (PR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Mean Arterial Pressure (MAP), Rate Pressure Product (RPP), Cardiac Output (CO), Central Venous Pressure(CVP), Labetolol, N.T.G, Xylocard, C.M RO2 .

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ABSTRACT *INTRODUCTION: The pressure response, which was part of a huge spectrum of stress response, results from the increase in sympathetic and sympathoadrenal activity. A comparison between labetolol, ntroglycerine and xylocardl in suppressing the pressor response for intubation in intracranial surgeries was studied.*

OBJECTIVE: This study was done to compare the effectiveness of labetalol,nitroglycerine and xylocard in attenuating the pressor responses associated with laryngoscopy and endotracheal intubation in groups belonging to normotensive ASA grade 1, 2 risk surgical patients.

MATERIAL: The study was carried out on 80 patients belonging to ASA grade I and II, aged 18 to 45 years, including either gender, scheduled for neuro surgical procedures under general anesthesia. They were divided into 4 groups of 20 patients each, which were receiving normal saline, Labetolol, xylocard and NTG respectively.

RESULT: It was concluded that labetalol was more effective in preventing the rise in heart rate and rate pressure product to larngoscopy and intubation than xylocard and nitroglycerine

Nitroglycerine was more effective than labetalol and xylocard in attenuating the rise in systolic ,diastolic and mean arterial pressures.

INTRODUCTION:

Endotracheal intubation was one of the most frequently performed procedures in the practice of anaesthesia.endotracheal intubation includes laryngoscopy and translaryngeal placement of a tube into the trachea via the nose or mouth under anaesthesia.

The above process frequently induces hemodynamic responses via increased serum catecholamines. A reflex process mediated by 9th & 10th cranial nerves getting afferent stimulus from epiglottis and infraglottis region and activate the vasomotor centre (Ried & Brace 1940)[1]. These facts were also derived from studies of volatile anaesthesia (King, Harris & Griefenstein 1951, Burstien, Lio-Pinto & Newman 1950, King et al:1951)[2].

Mechanical stimulation of respiratory tract results in cervical sympathetic efferents activity, Timori & Widdo combe 1969, study results in rhythm disturbances, heart failure, pulmonary and cerebral edema. Various pharmacological and non;pharmacological methods have been used to attenuate the haemodynamic responses in ASA Grade - I & II patients.

In childrens the pressor response to intubation was mediated by increase of vagal tone at the SA Node. In adults it was due to sympathetic efferents via cardiac accleretor fibres, Timori & Widde combe 1969.

The predominance response was increase of HR, BP, CO which were associated with transient raise of CVP. Corbett et al 1969.

All these due were to increase of Plasma levels of NEPN & EPN Russel et al 1981.

Labetalol was an unique parenteral and oral antihypertensive drug that exhibits selective alpha 1 and non selective beta 1 and beta 2 adrenergic antagonist activity with the elimination half life was 5.5 hours and the total body clearance was 33 ml/kg/min. in man, the ratios of alpha to beta blockade was 1:3 and 1:7 following oral and intravenous administration respectively. Rare of flow was 2mg/min i.e., 2ml/min.

Lignocaine was an amide group of local anaesthetic drug with effects on the cardiovascular system.lignocaine belongs to class Ib of antiarrythmic drugs after a single intravenous dose the drug levels of lignocaine fall first by redistribution from central to peripheral tissues.thus the t ½ was 8 minutes and the onset of action was 45 sec but peak at 90 seconds.

Nitroglycerine is a polyester of nitric acid, has a low molecular weight and exists as moderately volatile oily liquid. the mechanism by which nitroglycerine compounds acts is unique. They were better vasodilators especially at lower serum concentrations. Their mode of action is unknown but may be related to its increased uptake by veins compared to arteries. Its elimination half – life was about 1.5 minutes.

In this study we have used intravenous bolus dose of labetalol hydrochloride, xylocard and nitroglycerine in ASA grade I and II patients to study the haemodynamic responses to laryngoscopy and intubation like pulserate,systolic blood pressure,diastolic and mean arterial pressure and rate pressure product. PR, SBP, DBP, MAP & RPP.

MATERIAL AND METHODS :

The study prospective , controlled and randomized was conducted in 80 normotensive adult patients of both sexes of age group 18-45 years, with to ASA grade I and II scheduled for neurosurgical procedures under general anaesthesia . They were divided into 4 groups of 20 each patients.

Group-A received normal saline, Group –B Received inj. Labetolol 0.2mg/kg/IV

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Group-C inj. Lignocaine 1.5mg/kg/IV, Group – D Received inj. N.T.G., 75µg/kg/IV

INCLUSION CRITERIA:
ASA-I and II
Either sex
Adults 18 – 45 years
Elective cases

EXCLUSION CRITERIA:
- History of hypertension
- Systolic blood pressure <100mm hg
- Pulse rate <60 beats per minute
- History of myocardial infarction within 3-6 months
- Sick sinus syndrome
- Conduction abnormalities
- NMJ Diseases

PREMEDICATION:
Tab Diazepam 10 mg on the night before surgery and Inj. Glycopyrrolate 0.2 mg IM 45 minutes before surgery, Inj Ondansetron 4mg/IV, Butorphenol 2.0mg/IV, Preoxygenated for 3min.

PROCEDURE:
18G Intravenous cannulation was done under local anaesthesia, drip was started with ringers solution

In all patients balanced anaesthetic technique was used and recorded basal hemodynamic parameters.

Inj. Thiopentone sodium 5mg/kg/IV as induction agent, Intubation was facilitated by succinyl choline 2mg/kg IV, Intubated with Laryngoscope <20sec., anaesthesia was maintained with nitrous oxide and oxygen, pancuronium bromide and halothane depending on the procedure .

Additional muscle relaxant was given only after a period of 5 minutes time at which the study was completed. The surgery was not allowed to commence till the procedure was completed.

Hemodynamic Parameters were recorded as follows:
- Base line on the operating table
- 30 seconds after administration of the drug .
- Immediately after intubation
- 1 minute
- 3 minutes and
- 5 minutes after intubation

Formula for rate pressure product = systolic blood pressure x pulse rate

Mean arterial pressure = diastolic blood pressure + 1/3 (SBP-DBP)

Statistical analysis was done by unpaired student 't' test. A 'p' value of <0.05 was considered as statistically significant, P of 0.01 as highly significant and p of 0.001 as very highly significant .A p of 0.05 was considered not significant.

OBSERVATION & RESULTS:
The study was planned to compare the efficacy of intravenous labetalol,lignocaine and nitroglycerine in attenuating haemodynamic response to tracheal intubation for intracranial surgeries.

Mean base line pulse rate in all the groups were comparable.

Comparing A and B, there was a significant decrease in heart rate after drug administration in group B. There was a significantly less rise in heart rate immediately after intubation, at 1 min ,3 min, 5 min after intubation in B group .the pulse rate decreased to lesws than basal value omly in labetalol group at the end of 5 min after intubation.

Comparing A with C, there was an insignificant increase in heart rate in boyh the groups after intubation.there was no statistically significant difference between the two groups post-intubation.

Comparing A and D, there was a significant increase in pulserate after drug administration in group D .there was no significant difference between two groups after intubation ,at 1 min and 3 min.pulse rate at 5 min was significantly higher in group D.

When compared to B group the pulse rate was significantly higher at all time intervals after drug administration in group C.

The pulse rate in group D was significantly high at all time intervals when compared with group B.

Comparing C and D,the pulse rate increased in both the groups after drug administration .the increase was not significant after intubation at 1 min and 3 min .at 5 min the pulse rate was significantly high in group D

The mean of basal mean arterial pressure in all the groups were comparable.

Comparing group A with B ,MAP was significantly lower in the B group after drug administration,after intubation and at 1 min.

Changes observed in A vs C ,group were similar to that of A vs B group.comparing A with group D ,there was significantly lower MAP at all time intervals except after drug administration in group D.

There was no significant difference in the MAP in group B and C .

Comparing B and D groups ,MAP remained significantly lower in the D group at all time intervals except at 5 min.

Changes observed in C vs D group were similar to that of B vs D

CHANGES OBSERVED IN PULSE RATE FROM BASAL LEVEL
TABLE-I

Group	Duration					
	Basal	Afterdrug	After intubation	1 min.	3 min	5 min.
Control Group A	90.9 ± 8.6	92.4 ± 9.99 P>0.1	104.9 ± 10.75 P<0.001	111.7 ± 11.87 PO.001	106.9 ± 9.87 PO.001	95.85 ± 8.3 P>0.5
Labetalol Group B	91.5 ± 8.09	79.5 ± 6.91 PO.001	94.5 ± 6.4 P>0.1	93.24 ± 6.18 P>0.1	90.75 ± 5.21 P>0.1	89.55 + 5.05 P>0.1

Lignocaine Group C	88.3 ± 7.29	94.15 ± 8.03 P>0.05	103.5 ± 8.12 P<0.001	106..5± 7.64 P<0.001	100.15 ± 7.84 PO.001	95.3 ± 8.53 P>0.05
Nitroglycerin Group D	87.1 ± 10.73	106.45 ± 11.80 P<0.001	105.7 ± 11.47 PO.001	107.3 ± 10.51 P<0.001	105.5 ± 8.22 PO.001	103.71 ±8.50 PO.001

PR INTRAGROUP COMPARISION

- In group A:PR changes after drug admwas not significant but it increased after intubation and at 1min,it is decreased at 3min.Thus shows highly significant.At 5min the PR was not significant compared to baseline.
- In group B: mean basal PR was decreased significantiy after drug administration ;increased after intubation and decreased at 1min,3min and 5min.so these values are not significantly different from the baseline.
- In group c : themean basal PR was increased after drug administration which was not significant ;increased PR after intubation and at 1min,which was significant compared to baseline,but the PR decreased at 3min and 5min.
- In group D : mean PR was increased after drug administration and sustained,shows little changes till 5min. The PR was significantly high at sll time intervals.

CHANGES IN PULSE RATE TABLE BELOW GIVES THE DETAILS OF STATISTICAL ANALYSIS
TABLE-II

		A vs B	A vs C	A vs D	B vs C	B vs D	C vs D
Basal	T	0.23	1.03	1.28	1.322	1.36	0.41
	P	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1
After drug administration	T	4.76	0.83	4.05	6.05	9.31	3.75
	P	<0.001	>0.1	<0.001	<0.001	<0.001	<0.001
After intubation	T	3.71	0.1	0.35	3.63	3.94	0.68
	P	<0.001	>0.1	>0.1	<0.001	<0.001	>0.1
1 min	T	6.17	1.643	1.24	5.41	6.31	0.35
	P	<0.001	>0.1	>0.1	<0.001	<0.001	>0.1
3min	T	6.4	1.92	0.56	4.87	7.76	1.98
	P	<0.001	>0.05	>0.1	O.001	<0.001	>0.05
5min	T	2.9	0.2	2.98	2.75	6.31	3.17
	P	<0.01	>0.1	<0.01	<0.01	<0.001	<0.01

INTER GROUP COMPARISION

- Comparision of A with B : there was significant decrease in HR after drug administration,significantly less increased after intubation,at 1min,3min and 5min,but decreased to less than basal valueonly in labetelol group at 5min when compared to A group.

- There was an insignificant increase in HR after intubation in A and C groups and no statistically significant difference between A and C groups after intubation.

- D group shows significant increase in PR after drug administration,but no significant difference between two groups after intubation at 1min and 3min;significantly higher at 5min when compared to A group.

- When compared to B group,the group C shows significant raise in HR at all time intervals after drug administration.

- The PR in group D was significantly high at all time intervals when compared with group B.

- PR was increased after drug administration in both C and D groups,but the increase was not significant after intubation at 1min and 3min;At 5min the PR was significantly increasedin group D only,

CHANGES OBSERVED IN SYSTOLIC BLOOD PRESSURE FROM BASAL VALUE
TABLE - III

Group	Duration					
	Basal	After drug	After intubation	1 min.	3 min	5 min.
Control Group A	122.5 + 10.12	123.17 ± 9.38 P>0.1	140.7 ±9 P<0.01	143.7 ± 12.07 P<0.001	129.3 ± 9.7 P<0.001	123.7 ± 10.1 P>0.1
Labetalol Group B	124.4 ±7.95	118.4 ± 7.13 P<0.01	135 ±4.78 P<0.001	133.6 ± 3.35 P<0.001	125.8 ± 2.60 P>0.1	124.4 ± 4.8 P>0.1
Lignocaine Group C	123.5 ±6.51	113.8 ± 4.53 P<0.001	135.5 ± 7.56 P<0.001	133 ±6.5 P<0.001	127.2 ± 4.42 P>0.05	122.8 ± 3.58 P>0.1
Nitroglycerin Group D	125.5 ±9.02	121.73 ± 9.43 P>0.1	122.6 ± 9.58 P>0.1	123.45 ± 9.02 P>0.1	122.6 ± 8.11 P>0.1	121.8 ± 7.56 P>0.1

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SBP INTRAGROUP COMPARISION

- Group A : mean basal SBP was not statistically altered even after drug administration ;but increased after intubation and at 1min which was very highly significant. there was a at 3min,but shows no significant difference from the baseline at 5min.
- Group B: significant decrease in mean SBP after drug administration,but increased after intubation and at 1min which was highly significant .there was no significant difference from the baseline at 3min and 5min.
- Group C :the mean SBP decreased from baseline which was highly significant .But significant increase after intubation ,later it falls at 1min and 3min.At 5min the SBP was notsignificantly different from the baseline.
- Group D : decrease inSBP from baseline after drug administration was not a significant .But there was no significant difference with baseline value at all time intervals.

CHANGES IN SYSTOLIC BLOOD PRESSURE TABLE BELOW GIVES THE DETAILS OF STATISTICAL ANALYSIS
TABLE - IV

		A vs B	A vs C	A vs D	B vs C	B vs D	C vs D
Basal	T	0.7	0.37	1	0.4	0.43	0.29
	P	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1
After drug administration	T	2.07	4.16	0.69	2.85	1.1	3.33
	P	O.02	<0.001	>0.1	<0.01	>0.1	<0.01
After intubation	T	2.51	2.08	6.67	0.21	5	4.72
	P	<0.02	<0.05	<0.001	>0.1	<0.001	<0.001
1 min	T	3.58	3.55	5.97	0.42	4.54	3.73
	P	<0.001	<0.001	<0.001	>0.1	<0.001	<0.001
3min	T	1.76	0.89	2.4	0.87	1.6	2.39
	P	>0.05	>0.1	<0.05	>0.1	>0.1	<0.05
5min	T	0.28	0.48	0.68	1	1.51	0.5
	P	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1

COMPARISIONS OF INTERGROUPS

- There was a significant decrease in SBP after drug administration, but less significant increase after intubation and at 1min and no significant difference at 3min and 5 min when compared the A with B group.
- Less significant increase in mean SBP after intubation and at 1min in group C compared with A and no significant difference at 3min and 5min.
- Comparing A with D ,the SBP after drug administration was comparable,but less significantly increased after intubation ,at 1min and 3min in group D.
- Compare B with C,more significantly fall in BP after drug administration in group C,but other values in both groups were comparable.
- Compare B with D,no significant difference in fall in SBP in both groups after drug administration,but significantly low after intubation and at 1minn in group D.
- Compare C with D,a significant fall in SBP in group C,there was a significantly less rise in SBP in group D.

CHANGES OBSERVED IN DIASTOLIC BLOOD PRESSURE FROM BASAL VALUE
TABLE-V

Group	Duration					
	Basal	After drug	After intubation	1 min.	3 min	5 min.
Control Group A	80.6 ± 5.67	80.4 ± 6.04 P>0.1	107.1 ±6.85 P<0.001	97.4 ± 8.52 P<0.001	89.5 ± 7.22 P<0.001	84.1 ± 5.78 P>0.05
Labetalol Group B	83.4 ± 5.65	74.6 ± 3.96 P>0.01	94 ± 5.23 P<0.001	90.7 ± 3.18 P<0.001	86.5 ± 2.67 P>0.1	83.6 ± 4.44 P>0.1
Lignocaine Group C	81.2 ± 6.81	71.5 ± 5.88 P<0.001	96 ± 9.84 P<0.001	92 ± 8.8 P<0.001	85.9 ± 7.52 P>0.05	84.4 ± 6.74 P>0.05
Nitroglycerin Group D	81.95 ± 7.13	78.4 ± 6.45 P>0.1	79.15 ± 5.23 P>0.1	80.6 ± 5.16 P>0.1	83.1 ±4.7 P>0.1	81.1 ± 5.33 P>0.1

DBP INTRA GROUP COMPARISION

- Group A : the mean basal DBP shows no significant difference after drug administration, but increased after intubation which was highly significant. later it falls at 1min and at 3min,shows very high significant compared to basal value. No significant difference with baseline at 5min.
- Group B : significant decrease in DBP after drug administration, later increased immediately after intubation and at 1min but shows no significant difference from baseline at 3 min and 5 min.
- Group C : the changes were similar to group B ,significant fall in DBP,later significant increase after intubation and at 1min.At 3min and 5 min the values were not significant compared to basal DBP.
- Group D : the DBP decreased from baseline,which was not a significant ;also shows no significant difference from the baseline at all time intervals after intubation.

CHANGES IN DIASTOLIC BLOOD PRESSURE TABLE BELOW GIVES THE DETAILS OF STATISTICAL ANALYSIS
TABLE - VI

		A vs B	A vs C	A vs D	B vs C	B vs D	C vs D
Basal	T	1.66	0.3	0.65	1.1	0.68	0.31
	P	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1
After drug administration	T	3.87	5.8	1.03	2.12	2.48	3.95
	P	<0.001	<0.001	>0.1	<0.05	<0.02	<0.001
After intubation	T	6.66	3.32	11.2	0.8	8.65	6.8
	P	<0.001	<0.01	<0.001	>0.1	<0.001	<0.001
1 min	T	3.44	2.07	7.62	0.6	7.46	5.24
	P	<0.01	<0.05	<0.001	>0.1	<0.001	<0.001
3min	T	1.75	1.55	3.12	0.78	2.16	1.56
	P	>0.05	>0.1	<0.01	>0.1	<0.05	>0.1
5min	T	0.31	0.15	1.734	0.5	1.56	1.71
	P	>0.1	>0.1	>0.05	>0.1	>0.1	>0.05

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INTERGROUP COMPARISION

- Significant decrease in mean DBP after drug administration in group B compared to A,but less significantly increased DBP after intubation and at 1min .No significant difference at 3min and 5min.
- Changes observed in A vs C were similar to that of A vs B group.
- A vs D comparision shows less significant decrease in DBP after intubation,at 1minand at 3min in group D,but there was no significant difference at 5min.
- Mre significantly decreased in B than C,but the values at other time intervals were comparable In both groups.
- B vs D group shows significant decrease in DBP after drug administration in group B and attenuation was more in group D after intubation and at 1min.later there was no significant difference at 3min and 5min.
- Changes observed with group C vs D were similar to that of B vs D.

CHANGES OBSERVED IN MEAN ARTERIAL PRESSURE FROM BASAL VALUE TABLE-VII

	Duration					
Group	Basal	After drug	After intubation	After 1 min	After 3 min	After 5 min
Control Group A	94.75 ± 6.54	94.8 ± 6.3 P>0.1	118.3 ± 6.58 P<0.001	112.3 ± 7.79 P<0.001	102.69 ± 6.92 P<0.001	94.73 ± 6.72 P>0.1
Labetalol Group B	98.53 ± 6.53	89.15 ±4.8 P<0.001	107.7 ± 5.01 P<0.001	104.78 ± 4.67 P<0.001	99.7 ± 3.06 P>0.05	97.38 ± 6.08 P>0.1
Lignocaine Group C	95.65 ± 8.32	85.58 ± 6.06 P<0.001	109.15 ± 7.78 P<0.001	105.67 ± 7.47 P<0.001	100.63 ± 9.24 P>0.05	97.06 ± 8.78 P>0.05
Nitroglycerin Group D	94.53 ± 7.33	93.7 ± 6.85 P>0.1	93.3 ± 6.34 P>0.1	94.2 ± 8.81 P>0.1	96.34 ± 5.12 P>0.1	94.5 ± 4.47 P>0.1

MAP INTRAGROUP COMPARISION

- Group A : mean basal MAP changes were not significant statistically even after drug administration, but increased after intbation, decrease at 1min and at 3min,finally no significant difference at 5min.
- Group B : significant decrease in MAP after drug administration, increased after intubation and at 1min,which was very highly significant, but shows no significant difference from baseline at 3 min and 5min.
- Group C : MAP decreased from baseline which was highly significant, but significant increase after intubation ,later falls at 1min and 3min.finally at 5min,the MAP was not significantly different from baseline.
- Group D : not a significant fall in MAP from baseline after drug administration, but no significant difference with baseline value at all time intervals.

CHANGES IN MEAN ARTERIAL PRESSURE TABLE BELOW GIVES THE DETAILS OF STATISTICAL ANALYSIS TABLE-VIII

		A vs D	A vs C	A vs D	BsC	B vs D	C vs D
Basal	T	1.94	0.69	0.08	0.49	1.65	0.4
	P	>0.05	>0.1	>0.1	>0.1	>0.1	>0.1
After test solution	T	3.84	4.63	0.48	2.06	2.43	3.86
	P	<0.001	<0.001	>0.1	<0.05	<0.02	<0.001
AFT intubation	T	6.01	3.92	12.13	1.21	7.7	7.8
	P	<0.001	<0.001	O.001	>0.1	<0.001	<0.001
1 min	T	3.82	3.02	6.48	0.5	4.29	3.81
	P	<0.001	<0.01	<0.001	>0.1	<0.001	<0.001
3min	T	1.77	0.71	3.65	0.45	2.58	1.8
	P	>0.05	>0.1	<0.001	>0.1	<0.02	>0.1
5min	T	1.65	1.21	0.13	0.12	1.79	1.7
	P	>0.1	>0.1	<0.001	>0.1	>0.05	>0.1

INTERGROUP COMPARISION

- MAP significantly decrease in B group than A group after drug administration ,after intubation and at 1min.
- A vs C changes were similar to A vs B group.
- A vs D changes shows significantly decreased MAP at all time intervals except after drug administration in group D.
- No significant difference in MAP in group B and C.
- B vs D changes shows significantly decreased MAP in
  - group D at all time intervals except at 5min.
- C vs D changes were similar to B vs D group

CHANGES OBSERVED IN RATE PRESSURE PRODUCT FROM BASAL VALUE TABLE - IX

Group	Duration					
	Basal	After drug	After intubation	After 1 min.	After 3 min	After 5 min.
Control Group A	11174.8 ± 2223	11463.3 ± 1465 P>0.1	14002.7 ± 1958.63 P<0.001	16072.5 ± 2096.01 P<0.001	13907.4 ±2256 P<0.001	11874.5 5± 2266.6 P>0.1
Labetalol Group B	11433± 1437.26	9502.1 ± 1866.7 P<0.01	12764.5 ± 1111.85 P<0.01	12369.9 ± 984.23 P<0.05	11457.9 ±814.17 P>0.1	11142.1 ± 656.99 P>0.1
Lignocaine Group C	10918.8 ± 1201.91	10764.8 ± 1030.23 P>0.1	13323.4 ± 1619.5 P<0.001	14187.9 ± 1420.34 P<0.001	12845.7 ±1672.32 P<0.05	11875.05± 762.62 P>0.05
NTG Group D	10912.5 ± 1067.3	12981.6 ± 1928.36 P<0.001	12956.3 ± 1690.9 P<0.001	13348.6 + 1677.43 P<0.001	12943± 1379.79 P<0.01	12645.5 + 2762.87 P<0.001

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RPP INTRA GROUP COMPARISION

- Group A :no significant difference in RPP from baseline after drug administration, but increased after intubation and at 1min, which was very highly significant. Later RPP decreased at 3min and with no significant difference from baseline at 5min.
- Group B: significant decrease in RPP after drug administration,increased after intubation and then falls, no significant difference from baseline at 3 min and 5min.
- Group C :an initial increase in RPP after drug administration which was insignificant,later increased after intubation ,at 1min which was highly significant.values at 3 and 5 min were not significantly compared to baseline.
- Group D: significant increase in RPP after drug administration and highly significant raise at all intervals.

CHANGES IN RATE PRESSURE PRODUCT TABLE BELOW GIVES THE DETAILS OF STATISTICAL ANALYSIS
TABLE-X

		A vs B	A vs C	A vs D	B vs C	B vs D	C vs D
Basal	T	0.43	0.45	0.48	1.23	1.3	0.01
	P	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1
After drug administration	T	3.7	1.75	2.8	2.65	5.79	4.54
	P	>0.001	>0.05	<0.01	<0.02	<0.001	<0.001
After intubation	T	4.99	1.73	1.8	1.27	0.44	0.7
	P	<0.001	>0.05	>0.05	>0.1	>0.1	>0.1
1 min	T	7.16	3.33	4.54	4.7	2.25	1.63
	P	<0.001	<0.01	<0.001	<0.001	<0.05	>0.1
3min	T	4.57	1.69	1.631	3.34	4.15	0.2
	P	<0.001	>0.1	>0.1	<0.01	<0.001	>0.1
5min	T	1.38	0.001	0.97	2.05	2.35	1.1
	P	>0.1	>0.1	>0.1	<0.05	<0.05	>0.1

INTERGROUP COMPARISION

- RPP was significantly decreased at all time intervals except at 5min in B when compared to A group.
- A vs C changes shows not a significantly difference in both groups at all time intervals except at 1min.
- A vs D shows significantly higher in D group after drug administration and in A 1min after intubation.
- RPP was higher in group C at all time intervals compared to B group.
- B vs D changes shows significantly decreased RPP in group B at all time intervals except at 1min after intubation.
- RPP shows no significant difference at all time intervals except after drug administration in C vs D group comparision except at 1min.

DISCUSSION:

The larynx receives nerve supply from 9th & 10th cranial nerves getting afferent stimulus from epiglottis and infraglottis region and activate the vasomotor centre via sympatho adrenal system activation and releases catecholamines (Derbyshire.D.R. et al 1983).

The haemodynamic responses to laryngeal and tracheal stimulation studied in different forms of anaesthesia by Burstein & Liopinto 1950 and BD. King et al 1951[2] and were interpreted to be as a result of sympathoadrenal stimulation results in increase cardiac output than increased systemic vascular resistance and was associated with transient rise in CVP (Corbett et al 1969).

The SBP and DBP increased in 5 sec following L scope, intubation mainted for 1-2min and returns into basal levels in 5min (king et al 1951, Wycoff 1960)[4]

The sympathoadrenal response may be hazardous as it increases the work load of the myocardium and may result in left ventricular failure (Masson 1964), myocardial ischemia (Elizabeth J Fox 1972) and ventricular arrhythmias (Pyrs Roberts 1971)[5] and cerebral hemorrhage (Davidson 1968).

Attempts to reduce the pressor response by deeper planes of anaesthesia (King et al 1951), topical anaesthesia with lignocaine (C.Wycoff 1960)[4], IV Lignocaine (Robert K Stoelting 1978 and 1997)[6] , (Mounir Aboumadi 1977), adrenal blockers (Esmolol-Menling & Ebert et al 1986), Labetolol (Fischer et al 1985), Practolol (Pyrs Roberts 1971), vasodilators (SNP-Robert K Stoelting 1979), N.T.G (A –Fassulaki 1983), Narcotic (Fentanyl, Donalad.E.Martin 1982), AL fentanil (Crawford 1987), Sufentanil (Kay et al 1987), (Nifedepine-R.M.Khan and Iqbal Ahamed et al 1987), verapamil (Mikawa & H.Yaku 1992).

Pulse rate – our study demonstrates highly significant increased in heart rate in control group after intubation, at 1min & 3min and no significant raise at 5min, were compared to King et al 1951.

Compare the Labetolol group its value shows insignificant raise in heart rate at preoperative levels, but significant less raise with control group at all time intervals after intubation (Menchaul et al 1985).

Xylocard group findings shows insignificant raise in heart rate in study group after intubation and 1 min. At 3min, a significant raise but at 5min reveals insignificant, raise these findings were consistent of Miakawa et al 1990.

In NTG group significant raise in PR after drug administration and till 5min after intubation, but it was less significant raise in control group, correlates with Michael FM et al 1989 findings.

Both SBP & DBP falls significantly after Labetolol group, less raise after intubation, at 3 & 5 min which were in agree with study of Menchans et al 1985 and Vacevic et al 1992.

With Xylocard group significant fall in study group in all time intervals except at 5min where the SBP falls below normal and DBP came to near normal, results were corre-

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lated with Mikawa et al 1996, who found that both SBP & DBP were less significantly raised.

With NTG both SBP and DBP falls insignificantly when compared to preoperative values, but there was insignificant raise in BP at all time intervals, similar study of James et al 1989 (after 2min of intubation)

With Xylocard group significant fall in MAP after drug administration, but significant raise after intubation and at 1min, came near normal at 5min; correlates with Mikawa et al 1996 study group.

With NTG group shows insignificant fall in MAP after drug administration, insignificant raise at all time intervals, similar to ; James et al 1989 (where increase in SBP 2min after intubation, there was less raise in MAP & SVR with NTG than Xylocard group, G.D.Puri).

Comparative to study shows significant raise fall in MAP with NTG than Xylocard, but shows no significant difference at other time intervals and less significant raise in MAP with NTG than Labetolol.

RPP correlates with myocardial oxygen consumption and maintained a constant relationship to angina with coronary artery disease (Roy et al 1979 & 1993) with ischaemic changes in ECG when RPP was ≥22000 but critical limit of RPP for appearance angina was 11000.

Control group shows significant raise in all phases except at 5min where it was nearer to base line.

Labetolol group shows significant fall in RPP after drug administration but significant raise after intubation and at 1min but no significant raise of RPP at 3min and 5min; corresponds with study of Anderson et al 1985.

Xylocard group discloses a significant raise in RPP at all levels except at 5min where the raise was insignificant.

NTG group also reveals significant raise in RPP at all time intervals.

Compared to study shows less significant in RPP with labetolol at al time intervals than with lignocaine.

There was significant raise in RPP with NTG than labetolol except after intubation.

RPP shows no significant difference between NTG and Xylocard at all time intervals except after immediate drug administration.

CONCLUSION:

It was observed that labetalol prevents the rise in heart rate after laryngoscopy and intubation .The rise in systolic, diastolic, mean arterial pressure and rate pressure product were suppressed but not prevented.

Lignocaine suppressed the rise in heart rate, systolic, diastolic, mean arterial pressures and rate pressure product.

It was concluded that labetalol was more effective in preventing the rise in heart rate and rate pressure product to laryngoscopy and intubation than xylocard and nitroglycerin

Nitroglycerine was more effective than labetalol and xylocard in attenuating the rise in systolic, diastolic and mean arterial pressures.

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