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Effect of Intracuff Paracetamol 1.0% W/V in Prevention of Emergence Coughing and Sore Throat.

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ABSTRACT:

Postintubation-related events are a group of respiratory complications associated with tracheal intubation or extubation after general anesthesia. Few investigations have evaluated pharmacologic interventions as a means of reducing these complications. Efficiency of Intracuff Paracetamol is an area left not much explored hence this study was conducted to assess the effect of intracuff paracetamol 1.0% W/V in prevention of emergence coughing and Sorethroat.

Methodology: This prospective comparative study assessed the efficacy of intracuff paracetamol (1.0% w/v) in preventing emergence coughing and sore throat post-intubation. Patients undergoing elective general anesthesia were randomly assigned to either a control group (saline-filled endotracheal tube cuff) or a paracetamol group. Postoperatively, cough and sore throat were assessed at 2, 6, and 24 hours.

Results: Significant reduction in postoperative cough severity in the paracetamol group compared to the control group was noticed. No participants in the paracetamol group exhibited symptoms at 6 and 24 hours postoperatively. Similarly, the incidence of postoperative sore throat decreased significantly in the paracetamol group, with no symptoms observed at 6 and 24 hours.

Conclusion: This study demonstrates that intracuff paracetamol (1.0% w/v) is effective in preventing and reducing postoperative sore throat and cough.

Keywords: Cough, Intracuff, Paracetamol, Saline, Sore Throat

1. Background:

Post-intubation-related events, linked to tracheal intubation or extubation after general anesthesia, result from mucosal damage by airway instruments or the presence of a foreign body like an endotracheal tube (ETT) (McHardy FE, 1999). Notably, postoperative sore throat (POST) affects over 50% of surgical patients (Biro P, 2005). Emergence from anesthesia can lead to coughing, agitation, and increased pressure, causing adverse outcomes like bronchospasms and bleeding (Stoelting RK, 1977).

Strategies to prevent complications have evolved from non-pharmacological to pharmacological measures, focusing on minimizing trauma during airway manipulation. Limited research explores pharmacological interventions for POST (Stout DM, 1987) (Loeser EA 1983). Lidocaine is a commonly used drug, but its clinical impact is unclear due to inadequately defined administration routes (Tanaka Y, 2009).

Paracetamol, a non-opioid analgesic agent, has gained widespread acceptance for managing postsurgical pain and POST. There are studies investigating the effectiveness of intravenously administered paracetamol (Nanda S, 2017).

However, the efficiency of intracuff paracetamol, an area that has received relatively less attention, was the focus of this study. The study aimed to evaluate the impact of intracuff paracetamol, with a concentration of 1.0% w/v, in preventing emergence-related coughing and sore throat, shedding light on a previously unexplored aspect of POST & POC management.

2. Methodology:

After obtaining Institutional ethical committee clearance (IEC No: VMCIEC/017/2023), This Prospective observational study was conducted among patients undergoing elective surgery with general anaesthesia in a tertiary care hospital. The study was conducted for a period of 12 months.

Inclusion Criteria

1. Patients with age group 18–65 years
2. American Society of Anesthesiologists (ASA) Class I and II,
3. Mallampatti classification 1 -3
4. surgeries posted under general anaesthesia

Exclusion Criteria

1. laryngeal disease/surgery/tracheostomized
2. ASA Class III and IV,
3. Mallampatti classification 4
4. Difficult intubation, or failed extubation

Patients scheduled for surgeries under general anesthesia was randomly allocated to one of the two study groups (Group C & P). In C group, EndoTracheal Tube (ETT) cuff was filled with saline to prevent air leak during positive pressure ventilation guided with cuff manometer. While in P group, ETT cuff was filled with 1% paracetamol.

Care was taken to ensure that starting cuff pressure as approximately 20 cm H_2O and maintain it between 20-30 cm H_2O adequate enough to just prevent leak around cuff during positive pressure ventilation. Randomisation was carried out using time scale-a type of simple random sampling.

The following parameters were monitored. Volume and cuff pressure of saline and paracetamol injected in the cuff was noted at start and end of surgery. Total duration of anesthesia was also noted. Immediately after extubation, an independent observer blinded from the study group recorded the presence or absence of coughing. Similarly, in postoperative care unit, occurrence of coughing and sorethroat at 2hrs, 6 hrs and 24 hrs were recorded. Coughing was recorded as present or absent. Severity of cough is graded according to modified Minogue scale.

3. Results:

Out of 60 participants recruited in the study 29 (48.3%) were assigned to control group and 31 (51.7%) were assigned in study group.

The mean age group of the participants in the study group is 42.67 ± 11.34 and as that of control group is 45.34 ± 13.27. Majority of the study participants were males 34 (56.7%) and Around 26 (43.3%) were Females. According to American Society of Anesthesiologists (ASA) physical status classification, 38 (63.3%) were classified under ASA 1 (A person in good health) and 22 (36.7%) were classified under ASA 2 (A mild but well-managed or treated condition)

Around 23 (38.3%) fell under class I of Mallampatti scale (Complete visualization of soft palate), 29 (48.3%) fell under class II (complete visualization of the uvula) and 8 (13.3%) under class III (visualization of only the base of uvula).

The overall mean cuff volume was 8.05 ± 1.24 and overall mean cuff pressure was 26.75 ± 4.301. Whereas the mean cuff volume of control group was 8.07 ± 1.16 and that of study group was 8.03 ± 1.32. The mean cuff pressure of control group is 26.72 ± 4.07 and that of study group is 26.77 ± 4.57. No statistically significant difference was seen in cuff volume ($p = 0.626$) and cuff pressure ($p = 0.347$) between control and study groups. The severity of Postoperative Cough (POC) markedly diminished during the period spanning from extubation to the 24-hour follow-up assessment. None of the study participants within the experimental group exhibited symptoms of POC at the 6-hour and 24-hour mark, in stark contrast to the control group. (Table 1)

Additionally, our investigation revealed a consistent reduction in the incidence of Postoperative Sore Throat (POST) from the extubation phase through the 24-hour follow-up window. Notably, no occurrences of POST were recorded among the study group subjects at the 6-hour and 24-hour intervals, as opposed to the control group. (Table 2)

Furthermore, a notable decrease in the incidence of Postoperative Nausea and Vomiting (PONV) was observed within the study group in comparison to the control group at all examination time points, except for the 6-hour interval, during which Nausea and Vomiting were reported in both groups in similar proportions. (Table 3) This data signifies a positive trend in the effectiveness of our intervention in managing and alleviating POC, POST, and PONV.

4. Discussion:

Endotracheal intubation is crucial in anesthesia for airway safety but poses risks like postoperative sore throat (POST). Mechanisms include aseptic inflammation from pharyngeal mucosa irritation during laryngoscopy and persistent tracheal mucosa irritation by the

endotracheal tube (ETT). Traumatic injury may also result. Researchers seek to prevent and treat POST through various drugs and administration routes (Huang YS, 2010). This research adds a novel approach to mitigating postoperative sore throat (POST), contributing to the existing knowledge in the field.

Since ages various animal and human studies have proven Paracetamol to have anti-inflammatory effects. (Løkken P, 1980) This property has been taken up as an intriguing factor and its efficiency has been proven in this study. (Glenn, 1977)

POC severity markedly decreased post-extubation to the 24-hour follow-up. No study participants in the study group had POC at 6 & 24 hours compared to the control group. This difference was statistically significant at all time points except 2 hours. Incidence of POC was 3 times higher in our study at 2 hours but similar to Sunil Rajan et al. at 6 and 24 hours. (Rajan S, 2018)

Rafie et al. found Dexamethasone superior to lidocaine and normal saline in preventing postoperative cough (POC). Severe cough occurred in 16% with Lidocaine and 23% with normal saline, while none with Dexamethasone had severe cough. In our study, moderate POC was 31% at 2 hours, comparable to Rafie et al.'s 34% with dexamethasone. (Rafiei MR, 2012)

The study also proved a decrease in the incidence of POST starting from the period of extubation to 24 hours follow up. None of the study participants in the study group had POST at 6 & 24 Hours when compared with the control group. This difference was statistically signicant at all time periods of examinations. The incidence of POST is in our study was found to be 2 folds more than the study by Sunil Rajan et al at 2 hours but similar to their at 6 and 24 hours. (Rajan S, 2018)

Incidence of post operative Nausea and Vomiting was also seen to be less in study group when compared to that of the control group at all time periods of examinations except for that at 6 hours in which Nausea and vomiting was seen in both groups at equal proportions. But the differences were not statistically significant. This may be due to the fact that the difference between 2 groups may be negligible as well as the lesser number of sample size in this study may have also contributed to the statistical insiginificance.

Evenly mild difference was seen in the Pulse rate in between study and control groups. The difference was statistically significant at 6 hours and the rest were not.

5. Conclusion:

This study presents a conclusive finding that Intracuff Paracetamol at a concentration of 1.0% w/v is efficacious in both preventing and reducing the occurrence of Postoperative Sore Throat (POST) and Postoperative Cough (POC). While this research constitutes an initial foray into this novel approach, it has successfully demonstrated the effectiveness of Intracuff Paracetamol when contrasted with a control substance, specifically saline.

Further investigation and consideration are warranted to elucidate the comparative efficiency of Intracuff Paracetamol in relation to established pharmaceutical interventions such as Lidocaine. This exploration is imperative for a more comprehensive understanding of the potential therapeutic benefits of Intracuff Paracetamol in the context of POST and POC management.

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Tables:

Table 1: Assessing severity of cough at different time intervals

S.NO	Time of observation	MINOGUE grade	Control group (n = 29)	Study group (n = 31)	p value
1	At extubation	Grade 1	18 (39%)	28 (61%)	0.028*
		Grade 2	8 (80%)	2 (20%)	
		Grade 3	3 (75%)	1 (25%)	
		Grade 4	0	0	
2	At 2 hours	Grade 1	15 (37%)	25 (63%)	0.077
		Grade 2	9 (69%)	4 (31%)	
		Grade 3	4 (67%)	2 (33%)	

		Grade 4	1 (100%)	0	
3	At 6 hours	Grade 1	21 (40%)	31 (60%)	0.002*
		Grade 2	6 (100%)	0	
		Grade 3	2 (100%)	0	
		Grade 4	0	0	
4	At 24 hours	Grade 1	25 (45%)	31 (55%)	0.049*
		Grade 2	4 (100%)	0	
		Grade 3	0	0	
		Grade 4	0	0	

Table 2: Assessing severity of Sore throat at different time intervals

S.NO	Time of observation	Sore throat as per POST scores	Control group (n = 29)	Study group (n = 31)	p value
1	At extubation	No	4 (18%)	18 (82%)	0.002*
		Mild	11 (58%)	8 (42%)	
		Moderate	9 (75%)	3 (25%)	
		Severe	5 (71%)	2 (29%)	
2	At 2 hours	No	6 (21%)	22 (79%)	0.001*
		Mild	10 (67%)	5 (33%)	
		Moderate	8 (73%)	3 (27%)	
		Severe	5 (83%)	1 (17%)	
3	At 6 hours	No	16 (34%)	31 (66%)	0.000*
		Mild	6 (100%)	0	
		Moderate	5 (100%)	0	
		Severe	2 (100%)	0	
4	At 24 hours	No	18 (37%)	(63%)	0.000*
		Mild	5 (100%)	0	
		Moderate	4 (100%)	0	
		Severe	2 (100%)	0	

Table 3: Assessing occurance of Nausea & Vomiting at different time intervals

S.NO	Time of observation	Nausea and vomiting	Control group (n = 29)	Study group (n = 31)	p value
1	At extubation	Absent	28 (48%)	31 (52%)	0.483
		Present	1 (100%)	0	
2	At 2 hours	Absent	26 (47%)	29 (53%)	0.666
		Present	3 (60%)	2 (40%)	
3	At 6 hours	Absent	28 (48%)	30 (52%)	1.000
		Present	1 (50%)	1 (50%)	

4	At 24 hours	Absent	29 (48%)	31 (52%)	N.A
		Present	0	0	

Table 4: Assessing variation in pulse rate at different time intervals.

S.NO	Time of observation	Group	Mean	S.D	F	p value
1	At extubation	Control	81.38	8.616	2.677	0.107
		Study	77.42	10.019		
2	At 2 hours	Control	81.93	9.396	1.707	0.197
		Study	78.61	10.220		
3	At 6 hours	Control	81.90	8.478	4.409	0.040*
		Study	77.13	9.069		
4	At 24 hours	Control	81.00	7.550	3.835	0.055
		Study	77.06	7.987		