Effect of Pressure Support Ventilation Usage at the End of Surgery on the Recovery from General Anesthesia in Extra Peritoneal Surgery

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ABSTRACT:

BACKGROUND:

Recovery speed and quality from general anesthesia has been proposed as possible measure of quality of anesthesia. Recovery is affected by many factors; patient status, drugs used, surgical procedure and time of it.

OBJECTIVE:

To assess the effect of using pressure support ventilation at the end of surgery on the recovery from general anesthesia in extra peritoneal surgery.

METHODS AND RESULTS:

100 patients had enrolled in study from 1st/11/2014 till 20th/1/2016 in medical city complex hospitals.

All patients were received general anesthesia with endotracheal tube and same anesthetic management and considering score of 10/10 from modified aldrete criteria as aim in recovery. Patients were divided into two groups:

50 patients had received pressure support ventilation at end of surgery.

Other 50 patients had continued with muscle relaxant and controlled mechanical ventilation.

RESULT:

Patients with support ventilation had shorter recovery time 11.8 min than those with controlled ventilation 17.7min,this was statistically significant P value was 0.000 and clinically of importance by decreasing recovery time and decrease use of reversal of muscle relaxant.

CONCLUSION:

Pressure support ventilation at the end of surgery enhances recovery and decrease time of stay recovery site.

***KEY WORDS*:** pressure support ventilation, anesthesia recovery, aldrete score , muscle relaxant .

INTRODUCTION:

Recovery time: is period from the end of surgery to when the patient is alert and physiologically stable, speed and quality of recovery from anesthesia has been proposed as possible measure of quality of anesthesia [(1)].

Recovery is considered as the time of great physiological stress for many patients. I should be smooth and gradual awakening of a patient in controlled environment [(2)].

Recovery starts after completion of surgery where consciousness and muscle power and coordination are assessed. Muscle power may be assessed before the patient is conscious [(3)].full monitoring should not be discontinued before recovery of consciousness.

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Technique of anesthesia and ventilation mode being controlled or spontaneously breathing patients during procedure had effect on recovery time and discharge [(4)].

Discharge criteria and assessment of recovery usually depend on scoring system where we have aldrete scoring system (original, modified), the score is of(10) mark and patient should get (9) at least to be considered recovered well[(2,5,6)] .

Pressure Support Ventilation (PSV)

Allows the patient to determine inflation volume and respiratory frequency (but not pressure, as this is pressure-controlled), thus can only be used to augment spontaneous breathing. Pressure support can be used to overcome the resistance of ventilator tubing in another cycle (5 – 10 cm H20 are generally used, especially during weaning), or to augment spontaneous breathing [(7)].

PATIENTS AND METHODS:

From1st November 2014 to 20th 2016 in medical city complex in Baghdad/Iraq in renal transplant center and private nursing home hospitals.

Patients with extraperitoneal elective surgery which include (lower limb surgery and nephrectomy for renal transplant) duration of surgery were suspected to be 1-3 hours.

All 100 patients were ASA I-II and they were assessed preoperatively and plan for general anesthesia with endotracheal tube and essential monitoring were applied for all of patients from start of anesthesia till end of it and recovery with aldrete score 10/10 and patients ready to discharge.

Anesthetic procedure was started by preoxygenation for 3minute and midazolam 25mg/kg and remifentanyl infusion in 0.2-0.5mg/kg/min and adjusted to pulse rate and blood pressure, propofol in sleeping dose where there is loss of verbal communication with a patient and then atracurium in dose of 0.5mg/kg then intubation was done, patient were kept on controlled mechanical ventilation (volume controlled mode), maintenance of anesthesia was established with isoflurane inhalation, remifentanyl infusion and boluses of atracurium (20%of induction dose) were given to patients when there was activity of patients noticed by change in pressure wave in ventilator monitoring.

When the surgery became close to be finished and surgeon start to close layers till dressing which usually took about (15-20)min and patients had activity by observation the ventilator monitor at 1st five minutes of this time(we excluded patients if they did not have activity in these five minutes),this exclusion is to compare the difference **438** overy between patients who have some in this time.

50 patients were changed to pressure support ventilation mode in setting to achieve V_t of 7-9ml/kg, respiratory rate less than 20/min, S_pO_2>95 and E_tCO_2 =35-45$_{mm}H_g$ .and assessment of patients power was continuous.

Other 50 patients were given bolus of atracurium and kept on controlled mechanical ventilation.

Remifentanyl infusion and isoflurane inhalation were continued in titration manner till neostigmine with atropin were given, neostigmin was given to patients with pressure support at closure of skin, some patients had good power achieving good tidal volume with no need to neostigmine(8 patients) and to patients with controlled ventilation when they started to have activity.

Patients were observed after neostigmine continuously till achieve 10/10 of aldrete score to achieve the best recvory score. even we needed other dose of neostigmne, after that patients were observed for 30min. and discharged.

Statistical analysis: data tabulation, input and coding was done by the use of IBM© SPSS© (statistical package for the social science) statistic version 22 and Epi inf tm 7.

Independent sample t-test were used to test for significance.

Throughout data analysis.

RESULT:

1-patients with pressure support were
24 female---26 male.
Age was between 20-40 years.

2-patients with controlled ventilation were:
28 female-----22 male
Age was between 21-42 years

3-all patients were ASA I-II.

4-patients with pressure support had mean time of 11.8 min.to have 10/10 of aldrete score which was less than tatistically significant.

6-in patients with pressure support less reversal were needed:

(8)did not needed reversal,(40)needed 2.5mg neostigmine and (2)needed 5mg neostigmine.fiq(1).

While patients with controlled ventilation needed more reversal:(45) patients needed 2.5mg neostigmine and(5)patients needed 5mg.fig(2).

DISCUSSION:

In this study we try to get benefit from advanced technology in Anesthesia machines which include mode of ventilation other than controlled mode.

We used pressure support mode to enhance recovery to see the effect of anesthesia technique on recovery out come as study of pavlin and his group[4] who they improved that as our result, capdevilla and his team[8] who they demonstrated that use of pressure support enhanced recovery time in compares with patients received controlled mechanical ventilation and spontaneously breathing patients and there was less anesthetics required.

Table1:Statistical finding in.

		N	Mean	Std. Deviation	p-value	t	95% Confidence Interval of the Difference	
PS								
		50	11.80	3.024	0.000	-8.073-	Lower	Lower
CMV		50	17.70	4.191			-7.350-	-7.350-

PS(pressure support group), CMV(controlled mechanical ventilation group).showing difference in recovery time and P- value.
N=number of patients.
Mean=mean recovery time.

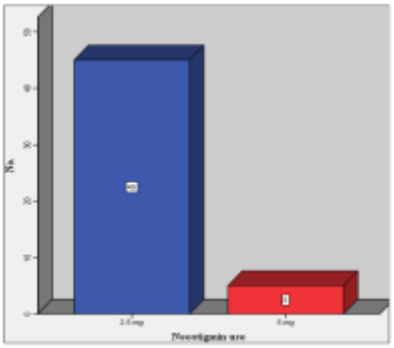

Fig 1:Neostigmine doses needed in patients with pressure support group.

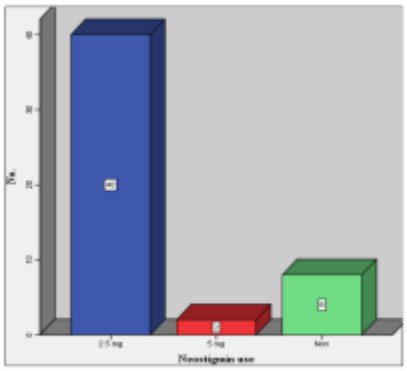

Fig 2:Neostigmine needed in patient with controlled mechanical ventilation.

Hisham,abushanab et al[9] showed that use of pressure support ventilation improved the postoperative outcome of adenotonsillecomy in paediatrics even less analgesia were required.
These findings may be explained by the fact that, pressure support ventilation decreased the inspiratory work of breathing during general anesthesia , christieJM[10] and also by fact that pressure support prevents diaphragmatic fatigue during weaning from mechanical ventilation larent[11]
Pressure support is well tolerated by patient[7] this may aided by using remifentanyl infusion which potentiates the effect of muscle relaxant and decreases the total dose of muscle relaxant required for surgery, Alaa and Raghad[12].
Use of inhalational affects muscle relaxants(potentiating) as in studies of Norman [13] and Wulf [14].
Pressure support may be used in patients with laryngeal mask airway with general anesthesia even in children and there was good result in outcome as in guanskan study[15] .
Pressure support also had arole in ambulatory surgery with better response than controlled ventilation lim[16].

There is encouragement to use pressure support for whole surgery time, bernad blok [17] showed that it is with better recovery. Recovery score (aldrete) we used to achieve 10/10 to ensure optimal recovery state[5,6].

CONCLUSION:

Usage of pressure support at end of surgery enhance the recovery status by decreasing recovery time, decrease the requirement for reversal of muscle relaxant and patients ready to be discharged within short time.

We recommend getting benefit from advanced technology in modern anesthetic machine.

We recommend to perform further study in using pressure support ventilation in peritoneal surgeries with intestinal manipulation and to see the benefit of using pressure support ventilation in whole surgery time.

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