Survey of Respiratory Support for Intensive Care Patients in 10 Tertiary Hospital of Thailand

Kaweesak Chittawatanarat MD, PhD*[1], Kanwan Jaikriengkrai MD*[2],
Chairat Permpikul MD*[3], Thai Society of Critical Care Medicine Study group*[4]

*[1] *Department of Surgery, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand*
*[2] *Fellow of Critical Care Medicine, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand*
*[3] *Department of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand*
*[4] *The Thai Society of Critical Care Medicine, Royal Jubilee Building, Bangkok, Thailand*

Objective: *There are varieties of clinical practices for intensive care respiratory support. However, there has been no published report characterizing its current practice in Thailand. The present study was undertaken to characterize the practice of respiratory support for intensive care patients in Thai tertiary hospitals.*

Material and Method: *A cross-sectional survey and retrospective historical cohort of intensive care units (ICUs) was performed on May 30, 2011 from ten tertiary hospitals in Thailand. The participating ICUs were asked to complete the following data of all patients who were mechanically ventilated in the ICUs: demographic data, characteristics of respiratory support, ICU type, causes of respiratory failure, and weaning technique.*

Results: *A total of 258 patients from ten tertiary hospitals were included and analyzed. The medical ICU patients remained in the ICU significantly longer than patients in other ICUs. Patients in surgical ICUs were significantly younger than patients in other ICUs. The prevalence of mechanically ventilated patients in this survey was 64.7% with a significantly higher proportion in the medical ICUs. The median of ventilator days was also significantly higher in the medical ICUs. An invasive ventilator was more commonly used in all ICUs rather than non-invasive ventilators. The three common causes of respiratory support were severe sepsis or septic shock, respiratory failure and post-operation, respectively. Volume-controlled continuous mandatory ventilation (VC-CMV) ventilation was more commonly used as the initial mode of ventilation in both surgical and medical ICUs. The maximum plateau pressure was significantly higher in the medical ICU patients but there were no differences in maximum tidal volume and PEEP level. One-third of the patients were in the weaning process, mostly in the medical ICUs. Pressure support was the predominant weaning mode in the medical ICUs, while synchronized intermittent mandatory ventilation (SIMV) was more predominant in the surgical ICUs. Protocol-based weaning was used in approximately two-thirds of patients who were in the weaning process. With repeated estimation equation logistic model and left censors' cohort to 28 days, the medical ICUs had significantly lower ventilator free overtime individual patients when compared with surgical ICUs, while there was no difference within mixed ICUs.*

Conclusion: *The VC-CMV was more commonly used as the initial mode of ventilation in both surgical and medical ICUs. Pressure support was the predominant weaning mode in the medical ICUs, while SIMV was more predominant in the surgical ICUs. Individual patients in medical ICU had a greater number of ventilator days and less probability of being ventilator-free.*

Keywords: *Ventilatory support, Thai ICUs, Weaning of ventilator, Mode of ventilation*

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The key purposes of mechanical ventilator (MV) are to maintain adequate oxygenation, proper gas exchange, decrease work of breathing, and supporting circulatory failure patients. Ventilation mode selection depends on diseases and their severity. Currently, because of current higher performance of microprocessor, many new respiratory models have been developed(1-3). Of these, ventilator mode selection is dependent on patient conditions, physician preference and experiences. However, there were no data available of these in Thailand. In addition, these data might be basic beneficial information for future awareness and knowledge management in MV utilization. The objective of the present study was to describe current practices and patterns of mechanical

Correspondence to:
Chittawatanarat K, Division of Surgical Critical Care and Trauma, Department of Surgery, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand.
Phone: 053-945-533, Fax: 053-946-139
E-mail: kchittaw@gmail.com

ventilation usage in intensive care units (ICU) in the tertiary hospitals of Thailand.

Material and Method

A cross sectional study with historical retrospective cohort database of Thai Society of Critical Care Medicine (TSCCM) was used in the present study. This database was performed by surveying all patients who were admitted in participating ICUs on May 30, 2011. The record form was distributed and clarified by TSCCM research committee to all participated ICUs before the appointment date. The communications between institutes was collaborated by TSCCM. All admitted patients in ICUs on that day were included in data collection process. The present study was approved by Ethics Committee, Faculty of Medicine, Chiang Mai University. ICU type, demographic data, mechanical ventilator usage, cause ventilator support, mode and ventilator setting, weaning mode and methods were recorded on this database. The patient was anonymous.

Mode of ventilator support was divided into two periods, initial and the predominant mode at this ICU admission. Of these, basic invasive mechanical ventilator (IMV) modes was collected including volume control continuous mandatory ventilation (VC-CMV), pressure control ventilation (PCV), synchronous intermittent mandatory ventilation (SIMV), pressure support ventilation (PSV). In addition, the non-invasive mechanical ventilation also recorded. Ventilator usage in patient was recorded by duration of days of invasive, non-invasive and discontinuation of mechanical ventilation.

STATA 11.0 software was used in the present study. Data was described in percent for categorized data and mean with standard deviation (SD) or median with interquartile range (IQR) for continuous data with parametric and non-parametric distribution respectively. Differences between groups were calculated. Student t-test was used for normal distribution and Mann Whitney U test was used for non-normal distribution of continuous data. Chi-square and Fisher exact tests were used for two-category variables. For comparison between more than two continuous variables, the ANOVA test was used for normal distribution and Kruskal Wallis was used for non-normal distribution. Logistic regression was used to estimate the relationship between predictor and outcome variable and reported with odds ratio and 95 percent confidence interval. Statistical significance was defined as p-value <0.05.

Results

Surgical, medical, and mixed ICUs in ten tertiary hospitals on May 2011 participated in this study. A total of 258 patients were divided into three groups (135 in medical ICUs, 109 in surgical ICUs and 14 in mixed ICUs). In Table 1, there were no differences in gender and body weight among groups. However, there were differences in the average age between groups. Mixed ICU patients had a higher tendency of median age than the others. The median (IQR) of ICU length of stay (LOS) prior to the survey day was 8 (13), 6.5 (8) and 5 (9) in medical, mixed and surgical ICUs, respectively (p = 0.03). MV usage status prevalence was 64.7% still used during survey with highest in medical ICU (73.3%). Of these, the median (IQR) of IMV-day was 6 (12) with highest in medical ICU 8 (14). Almost patients had used IMV (98.2%). The three most common causes of IMV use were severe sepsis/septic shock, respiratory failure and post-operation, respectively.

In Table 2, the two most common initial ventilator modes of IMV were VC-CMV and PCV (45.8 and 40.4% respectively). Interestingly, while most of the medical and mixed ICU patients started with PCV, VC-CMV and SIMV were predominant in surgical ICUs with statistically significant differences. The predominant ventilator modes had the same direction as the initial model. The mean (SD) of maximum plateau pressures (Ppla) were 18.1 (9.7) and 17.2 (11.5) at survey and during admission, respectively. These were a statistically higher level in medical and mixed ICUs than surgical ICUs (Table 3). Maximum tidal volumes per body weight (TV/BW) were 8.1 (2.9) and 8.8 (3.3) at survey and during admission. In a subgroup of patient with ARDS diagnosis, TV/BW was more than 8 mL/kg (Table 2). For weaning of ventilator, 34.8 percent of patients were in the weaning process and 21.7 percent were successful. In the latter group, medical patients had a significantly lower weaning success. Pressure support and T pieces were two predominant modes of MV discontinuation. NAVA and ASV were not used in this cross section survey. Pressure support was more commonly used in medical and mixed ICUs than in surgical ICUs. SIMV was used at a higher portion in surgical ICUs than medical and mixed ICUs. Nearly 70 percent of patients had undergone a protocol based weaning process.

To compare each days probability of prevalence ventilator free between ICU types (Table 3), medical ICUs had less ventilator free days than surgical ICUs [OR: 0.48 (0.14-1.73); p = 0.01]. ICU

Table 1. Patient characteristics

	All (n = 258)	Medical (n = 135)	Surgical (n = 109)	Mixed (n = 14)	p-value
Gender (M:F)	149:109	71:64	70:39	8:6	0.19
Age in years [median (IQR)]	66 (30.5)	68 (27)*+	61 (31)*++	79.5 (21)+ ++	<0.01
Body weight in kg a [median (IQR)]	57 (15)	56 (11)	60 (15)	56 (16)	0.57
ICU LOS prior survey [median (IQR)]	6 (11)	8 (13)*	5 (9)*	6.5 (8)	0.03
MV used status prevalence					
Never used (%)	32 (12.4)	14 (10.4)	17 (15.6)	1 (7.1)	0.39
Once used (%)	59 (22.9)	22 (16.3)	31 (28.4)	6 (42.9)	0.02
Still used (%)	167 (64.7)	99 (73.3)	61 (56.0)	7 (50.0)	<0.01
Ventilator day at survey [median (IQR)]					
Invasive	6 (12)	8 (14)*	4 (7.5)*	4 (8)	<0.01
Non-invasive	0 (0)	0 (0)	0 (0)	0 (0)	0.72
Stop day	0 (1)	0 (0)	0 (1)	0 (1)	0.12
Type of mechanical ventilator usage					
Invasive (%)	222 (98.2)	120 (99.2)	89 (96.7)	13 (100)	0.36
Non-invasive (%)	8 (3.5)	4 (3.3)	4 (4.4)	0 (0)	0.71
Cause of MV support (%)					
Acute respiratory failure	67 (29.7)	46 (38.0)	16 (17.4)	5 (38.5)	<0.01
COPD	12 (5.3)	11 (9.1)	0 (0)	1 (7.7)	0.01
Heart failure	23 (10.2)	20 (16.5)	2 (2.2)	1 (7.7)	<0.01
Severe sepsis/septic shock	78 (34.5)	53 (43.8)	22 (23.9)	3 (23.1)	<0.01
Metabolic disturbance	26 (11.5)	23 (19.0)	3 (3.3)	0 (0)	<0.01
Post-operation	60 (26.6)	7 (5.8)	50 (54.4)	3 (23.1)	<0.01
Neurologic disease	53 (23.5)	25 (20.7)	27 (29.4)	1 (7.7)	0.13
Volume overload	21 (9.3)	13 (10.7)	6 (6.5)	2 (15.4)	0.43
Multiple trauma	14 (6.2)	1 (0.8)	12 (13.0)	1 (7.7)	<0.01
Others	4 (1.8)	2 (1.7)	1 (1.1)	1 (7.7)	0.24

* p<0.05 comparing between medical and surgical ICU; + p<0.05 comparing between medical and mixed ICU; ++ p<0.05 comparing between surgical and mixed ICU.
M = male; F = female; IQR = interquartile range; kg = kilogram; ICU = intensive care unit; LOS = length of stay; MV = mechanical ventilator; COPD = chronic obstructive pulmonary disease

location (regional vs. Bangkok) and gender (male vs. female) were no difference in odds ratio of mechanical free prevalence. Increasing of ICU stay was significantly decrease probability of ventilator free in all ICUs type. However, surgical ICU had higher probability than medical and mixed ICU (Table 3 and Fig. 1).

Discussion

This research was performed within ten tertiary hospitals in Thailand; different types of ICUs had different ages and previous number of day before survey day. The latter might relate to patient turn-over rate. Of these, the turnover rate (lower on prior ventilator day) in surgical ICU might be higher than mixed ICU and medical, respectively. These might have occurred from patients' underlying diseases and significantly higher age in the two latter ICU patients (Table 1). Around 90% of mechanical support causes in the present study included acute respiratory failure, severe sepsis/septic shock and post-operation. This proportion was different from the prevalence in the Korean survey with 66% coverage on them[4]. While one-third of our patients were manipulated by IMV due to sepsis causes, the Korean prevalence of IMV in sepsis was less than ten percent[4]. Most of the patients admitted in our survey have experienced IMV (87.6%) and nearly three-quarters of them still used IMV on the surveyed day. Interestingly, while the NIV utilization in Korean study was 4%, there was no report of NIV use in our cross sectional survey and only 2.2% of our patients have experienced this[4]. Possible reasons might be instrument unavailability, physician familiarity and experiences for NIV usage as well as different diseases in each country.

Almost all of patient experiences on IMV were initiated with VC-CMV or PCV mode (96.2%). Medical

Table 2. Mechanical ventilator usage characters in ICUs

	All (n = 258)	Medical (n = 135)	Surgical (n = 109)	Mixed (n = 14)	p-value
Initial mode of MV support					
VC-CMV	103 (45.80)	40 (33.1)	60 (65.9)	3 (23.1)	<0.01
PCV	91 (40.40)	67 (55.4)	18 (19.8)	6 (46.2)	<0.01
SIMV	7 (3.11)	0 (0)	7 (7.7)	0 (0)	<0.01
PSV	7 (3.10)	5 (4.1)	0 (0)	2 (15.4)	<0.01
NIV (CPAP)	3 (1.30)	1 (0.8)	0 (0)	2 (15.4)	<0.01
NIV (BiPAP)	2 (0.90)	1 (0.8)	1 (1.1)	0 (0)	0.92
Bird	12 (5.30)	7 (5.8)	5 (5.5)	0 (0)	0.68
Predominant mode					
VC-CMV	59 (26.20)	21 (17.4)	35 (38.5)	3 (23.1)	<0.01
PCV	75 (33.30)	56 (46.3)	14 (15.4)	5 (38.5)	<0.01
SIMV	26 (11.60)	0 (0)	26 (28.6)	0 (0)	<0.01
PSV	50 (22.20)	35 (28.9)	11 (12.1)	4 (30.7)	0.01
Bird's	9 (4.00)	5 (4.1)	4 (4.4)	0 (0)	0.75
Others	6 (2.70)	4 (3.3)	1 (1.1)	1 (7.7)	0.31
Max. plateau pressure [a]					
At survey	18.1 (9.70)	21 (8.7)	14.8 (10.3)	15.7 (6.0)	<0.01
During admission	17.2 (11.50)	21.0 (10.5)	10.9 (11.5)	20.0 (4.3)	<0.01
Max. PEEP[a]					
At survey	5.0 (2.60)	5.3 (3.0)	4.7 (2.1)	4.6 (1.8)	0.55
During admission	5.5 (3.20)	5.8 (3.6)	4.6 (2.3)	6.4 (4.3)	0.16
Max. tidal volume [b]					
At survey	453.4 (153.60)	454.5 (145.7)	453.2 (162.2)	445.1 (178.6)	0.98
During admission	491.7 (172.30)	493.9 (170.6)	486.2 (181.0)	512.1 (127.4)	0.89
Max. TV/BW at survey [c]					
At survey	8.1 (2.90)	8.2 (2.9)	8.0 (3.0)	7.9 (3.1)	0.86
During admission	8.8 (3.30)	8.9 (3.2)	8.7 (5.6)	9.4 (2.6)	0.81
ARDS					
At survey	8.5 (3.30)	8.3 (3.6)	8.7 (3.2)	8.9 (1.0)	0.92
During admission	9.2 (3.60)	9.2 (3.3)	8.9 (4.8)	10.5 (2.9)	0.68
Weaning of ventilator (%)					
No	95 (43.00)	53 (44.2)	36 (40.5)	6 (50.0)	0.76
In process	77 (34.80)	49 (40.8)	26 (29.2)	2 (16.7)	0.09
Successful	48 (21.70)	18 (15.0)	26 (29.2)	4 (33.3)	0.03
Mode of weaning (%)					
T piece	41 (27.20)	19 (24.1)	21 (32.3)	1 (14.3)	0.40
Pressure support	67 (44.40)	41 (51.9)	21 (32.3)	5 (71.4)	0.02
SIMV	12 (8.00)	1 (1.3)	11 (16.9)	0 (0)	<0.01
NAVA	0 (0)	0 (0)	0 (0)	0 (0)	NA
ASV	0 (0)	0 (0)	0 (0)	0 (0)	NA
Others	8 (5.30)	7 (8.9)	1 (1.5)	0 (0)	0.12
Process of weaning (%)					
Protocol based	105 (69.10)	49 (62.8)	51 (76.1)	5 (71.4)	0.22
Individual based	29 (19.10)	20 (25.6)	8 (11.9)	1 (14.3)	0.11

[a] cmH_2O [mean (SD)]; [b] mL [mean (SD)]; [c] mL/kg [mean (SD)].

ARDS = acute respiratory distress syndrome; ASV = adaptive support ventilation; BiPAP = bi-level positive airway pressure; CPAP = continuous positive airway pressure; MV = mechanical ventilation; Max = maximum; mL = mililitre; NAVA = neurally adjusted ventilatory assist; NIV = non-invasive ventilation; PCV = pressure control ventilation; PEEP = positive end expiratory pressure; PSV = pressure support ventilation; SD = standard deviation; SIMV = synchronous intermittent mechanical ventilation; TV/BW = tidal volume to body weight ratio; VC-CMV = volume control continuous mandatory ventilation

ICU significantly preferred PCV to surgical ICU and contrary on VC-CMV. Only surgical ICU reported SIMV initiation mode on patients (7.7%). During ICU admission, both supportive modes were reduced to 59.5% which was substituted by SIMV and PSV. Medical ICU had a significant tendency to change to PSV than surgical ICU and reciprocal on SIMV (Table 2). These evidences demonstrated that initial and subsequent alteration on IMV mode selection depended on ICU types. These might be mediated by differences of principle diseases, physician preferences and experiences. Although these differences could not be related to patient outcomes and explanation for reasons of usage from the present study, SIMV had a lower probability of successful weaning than PSV in the previous study[5].

Table 3. Each day odds ratio of ventilator free

Parameters	Odds ratio (95% CI)	p-value
Type of ICU		
Medical ICU	0.43 (0.23-0.83)	0.01
Mixed ICU	0.48 (0.14-1.73)	0.27
Surgical ICU	Reference	
Hospital		
Regional	0.85 (0.46-1.57)	0.61
Bangkok	Reference	
Gender		
Female	0.78 (0.43-1.40)	0.41
Male	Reference	
Day after admission		
All ICU	0.94 (0.92-0.96)	<0.01
Medical ICU	0.95 (0.92-0.98)	<0.01
Surgical ICU	0.95 (0.92-0.97)	<0.01
Mixed ICU	0.85 (0.72-0.99)	0.05

For the ventilator setting adjustment, mean (SD) of maximum plateau pressure at survey and during admission were 18.1 (9.7) and 17.2 (11.5) cmH_2O, respectively, which was significantly higher in medical ICU than surgical and mixed ICU on both.

There were no differences on PEEP setting and tidal volume per body weight between ICU patients on both at survey period and admission. However, in patient with ARDS diagnosis (Table 2), the authors found that these patients received tidal volumes higher than the recommendation for this patient group[6]. However, because the severity of the disease was not evaluated with the present study, inappropriate settings could not be determined in the present study. In addition, the maximum plateau pressure in the present study was still lower than the recommendation for ARDS patients[6].

For the weaning process, 34.8% of patients were in process of discontinuing IMV. While medical ICUs is more significantly preferred pressure support mode, SIMV was the more predominant mode in the surgical ICUs (Table 2). However, currently weaning modes recommendations prefer a low level of pressure support or T-tube breathing than using of SIMV[7]. In Thai surgical ICU, spontaneous breathing trial with low pressure support protocol could reduce weaning time, ventilator days and ICU LOS[8]. Although the evidences of protocol directed weaning could reduce weaning time and ICU LOS, about 30 percent of patients

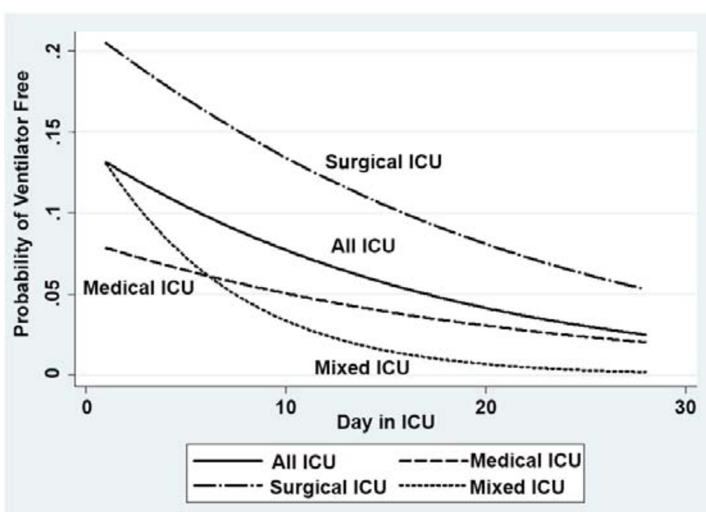

Fig. 1 Probability of ventilator free overtime in each types of ICU.

had the discontinuation of IMV without protocol in the present study(8-11). Current advance of non-conventional modes for weaning have been available including automatic tube compensation (ATC), adaptive supportive ventilation (ASV), Neurally adjusted ventilatory assist (NAVA) and Smartcare/PS(12). However, there were no reports of these in our survey. The reasons of these might be explained by devices unavailability, unfamiliar usage and inexperience of physicians.

At retrospective cohort with left censor at 28 days of ventilated free, medical ICU had a significantly lower OR of ventilator free probability than surgical ICU patients (Table 3 and Fig. 1). Hospital area and gender were no different. All ICU types had a significant decrease in ventilator-free probability in longer ICU stays and surgical ICU had higher probability of ventilator free than medical and mixed ICU (Table 3 and Fig. 1). These findings could be explained by IMV indications in each ICU type. An epidemiological review reported that IMV-associated worse outcomes were dependent on the principle of diagnosis. Postoperative respiratory failure had a better prognosis than respiratory failure from Coma, sepsis and ARDS(13).

There were some potential limitations of the present study. Firstly, the present study was a cross sectional study with historical cohort which might be confounded by survey data that might not represent the entire year, coverage time. Secondly, the present study was performed only in tertiary hospitals which might not reflect the general aspect of all Thai ICUs. Thirdly, severity of diseases and real time data overtime were not recorded. These might distort the ventilator setting pattern from standard guidelines and could not be concluded/included in the present study.

Conclusion

The VC-CMV was more commonly used as the initial mode of ventilation in both surgical and medical ICUs. Pressure support was the predominant weaning mode in the medical ICUs, while SIMV was more predominant in the surgical ICUs. Individual patient of medical ICU had longer ventilator days and less probability of being ventilator-free.

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Potential conflicts of interest

None.

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การสำรวจการช่วยการหายใจในหออภิบาลผู้ป่วยหนักในโรงพยาบาลระดับตติยภูมิในประเทศไทย

กวีศักดิ์ จิตตวัฒนรัตน์, กานต์วรรณ ใจเกรียงไกร, ไชยรัตน์ เพิ่มพิกุล, กลุ่มวิจัยสมาคมเวชบำบัดวิกฤต แห่งประเทศไทย

วัตถุประสงค์: *มีความหลากหลายในเวชปฏิบัติเกี่ยวกับการประคับประคองเกี่ยวกับการหายใจในเวชบำบัดวิกฤต อย่างไรก็ตาม ยังไม่มีรายงานเกี่ยวกับลักษณะของการใช้เครื่องช่วยหายใจในปัจจุบัน การศึกษานี้มีวัตถุประสงค์เพื่อบรรยายลักษณะการประคับประคองเกี่ยวกับการหายใจในไอซียูในโรงพยาบาลตติยภูมิ*

วัสดุและวิธีการ: *การศึกษานี้เป็นแบบภาคตัดขวางและการศึกษาย้อนกลับในไอซียู ซึ่งจัดเก็บข้อมูลในวันที่ 30 พฤษภาคม พ.ศ. 2554 จากโรงพยาบาลระดับตติยภูมิ 10 แห่งในประเทศไทย ผู้ที่เกี่ยวข้องจะทำการเก็บข้อมูลตามแบบสอบถามเกี่ยวกับ เครื่องช่วยหายใจที่ใช้กับผู้ป่วย ตลอดจนลักษณะทั่วไปของผู้ป่วย การช่วยการหายใจในไอซียู ชนิดของไอซียู และสาเหตุ การช่วยหายใจรวมถึงการหย่าเครื่องช่วยหายใจ*

ผลการศึกษา: *ผู้ป่วยทั้งหมดจำนวน 258 ราย จากโรงพยาบาลระดับตติยภูมิ 10 แห่ง นำเข้าสู่การศึกษาและวิเคราะห์ผู้ป่วยไอซียูอายุรกรรมรับเข้ารักษาในไอซียูนานกว่าไอซียูอื่นก่อนการศึกษา ผู้ป่วยศัลยกรรมมีอายุน้อยกว่าอย่างมีนัยสำคัญ ความชุกของการใช้เครื่องช่วยหายใจในการสำรวจนี้พบร้อยละ 64.7 โดยเฉพาะในไอซียูอายุรกรรม ค่ามัธยฐานของจำนวนวันของการใช้เครื่องช่วยหายใจพบสูงกว่าอย่างมีนัยสำคัญในไอซียูอายุรกรรม การใช้เครื่องช่วยหายใจโดยการใส่ท่อช่วยหายใจพบมากกว่า การไม่ใช้ท่อช่วยหายใจ สาเหตุหลักของการช่วยการหายใจ คือการติดเชื้อรุนแรง ภาวะหายใจล้มเหลวและการช่วยการหายใจ หลังการผ่าตัด การใช้เครื่องช่วยหายใจชนิด volume-controlled continuous mandatory ventilation (VC-CMV) เป็นการช่วยเหลือเบื้องต้นทั้งในไอซียูศัลยกรรมและอายุรกรรม และระดับความดันที่ปรับตั้งก็สูงกว่าในไอซียูอายุรกรรม โดยไม่พบความแตกต่างของการใช้ PEEP นอกจากนี้ยังพบว่าหนึ่งในสามของผู้ป่วยอยู่ในระหว่างการหย่าเครื่องช่วยหายใจ โดยส่วนใหญ่อยู่ในไอซียูอายุรกรรม การใช้ pressure support วิธีการหย่าที่นิยมในไอซียูอายุรกรรม ขณะที่ synchronized intermittent mandatory ventilation (SIMV) นิยมในไอซียูศัลยกรรม การใช้แนวปฏิบัติการหย่าเครื่องช่วยหายใจพบประมาณสองในสามของการหย่าเครื่องช่วยหายใจ เมื่อทำการวิเคราะห์เปรียบเทียบในระยะเวลา 28 วัน พบว่าไอซียูอายุรกรรมมีการความน่าจะเป็นของการไม่ได้ใช้เครื่องช่วยหายใจในแต่ละวันต่ำกว่าไอซียูศัลยกรรมอย่างมีนัยสำคัญ และไม่แตกต่างจากไอซียูรวม*

สรุป: *VC-CMV ใช้อย่างแพร่หลายในการตั้งเครื่องช่วยหายใจเริ่มต้นทั้งไอซียูศัลยกรรมและอายุรกรรม pressure support นิยมใช้ในไอซียูอายุรกรรม ในขณะที่ SIMV นิยมในศัลยกรรม ความชุกของการใช้เครื่องช่วยหายใจจะยาวมากขึ้นในไอซียู อายุรกรรม*
