Predictors of Prolonged Length of Stay in General Surgical Intensive Care Unit

Suneerat Kongsayreepong MD*[1], Naruenart Lomarat MD*[1],
Sarawut Thamtanavit MD*[2], Chaianan Sodapak MD*[3],
Torpong Vongvises MD*[4], Sutthima Kueaphet MD*[5],
Suchada Saeheng MD*[6], Chulaluk Komoltri PhD*[7]

*[1] *Department of Anesthesiology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*
*[2] *Division of Anesthesia, Chonburi Hospital, Chonburi, Thailand*
*[3] *Division of Anesthesia and Critical Care, Sunpasittiprasong Hospital, Ubonrachatanee, Thailand*
*[4] *Vipavadee Hospital, Bangkok, Thailand*
*[5] *Division of Anesthesia, Hatyai Hospital, Songkla, Thailand*
*[6] *Division of Anesthesia, Patalung Hospital, Patalung, Thailand*
*[7] *Division of Research & Development, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*

Objective: *The aims of this study were to explore the incidence, clinical factors, severity scores and outcome associated with prolonged length of intensive care unit (ICU) stay ≥3 days.*

Material and Method: *This study was a prospective observational study on the noncardiac surgical patients who were admitted to surgical intensive care unit in a tertiary university hospital. The cardiothoracic, neurosurgical and traumatic surgical patients or the patients who died within the first 3 days of ICU admission were excluded. Patient demographic data, preoperative predictors and severity scores (APACHE II, APACHE III, SOFA, SAPS II and MODS scores) at day 1 and day 3 of ICU admission were recorded.*

Results: *A total of 948 patients were observed. The incidence of prolonged ICU stay was 20.1%. Patients with prolonged ICU stay had significantly higher ventilator hours (p<0.001) and ICU length of stay (p<0.001). On the multivariable analysis model of preoperative variables, the significant predictors of prolonged ICU stay were preoperative serum albumin less than 2.6 mg/dL (p = 0.023), preoperative hematocrit less than 34% (p = 0.035), emergency surgery (p = 0.003), having surgical complications (p = 0.017), having anesthetic complications (p = 0.017), admission for respiratory support with or without unstable hemodynamic (p<0.001), and sepsis on ICU admission (p = 0.003). Regarding the multivariable analysis of severity scoring system, the significant severity predictors were found only the preoperative ASA class IV (p<0.001) and emergency ASA status (p<0.001).*

Conclusion: *About one-fifth of the study patients had prolonged ICU stay (≥3 days). Low preoperative serum albumin (<2.6 mg/dL), low preoperative hematocrit (<34%), ASA physical status class IV, underwent emergency surgery, having anesthetic complications, surgical complications, sepsis on ICU admission, having respiratory support with or without unstable hemodynamic were significantly associated with prolonged ICU stay.*

Keywords: *Prolonged stay, Surgical intensive care unit, Predictors, Severity scores, Albumin, ASA physical status*

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Length of stay (LOS) is considered as one of the important outcomes of care and resource utilization especially in the intensive care unit (ICU), which is the most expensive section of hospital cost[1,2]. Prolonged ICU length of stay had been reported to be associated with high morbidity, mortality, costs and may reflect the process of care[3-6]. Knowing which factors associated with prolonged ICU length of stay may provide information to guide clinical decision and care, reduce cost and resource utilization including the increase chance for quality improvement.

Even though prolonged LOS in a surgical intensive care unit (SICU) after surgery has been reported to be associated with preoperative patient characteristic, coexisting disease and preoperative

Correspondence to:
Kongsayreepong S, Division of Critical Care, Department of Anesthesiology, Siriraj Hospital Mahidol University, Bangkok 10700, Thailand.
Phone: +66-81-8427419
E-mail: suneerat.kon@mahidol.ac.th, suneeratkong@gmail.com

preparation[1,4-7]. For many surgeries intraoperative factors have generated higher odd ratio associated with prolonged ICU stay than preoperative factors such as type of anesthesia, adverse event associated with anesthesia and surgeries which reflect more with the skill of the operators and process of care[8-11].

A risk stratification of patient is an important tool to help predict outcome of the patient on a daily basis[12]. This includes such as preoperative American Society of Anesthesiologist (ASA) physical status[13] and commonly used severity scores such as the Acute Physiology and Chronic Health Evaluation (APACHE) II[14,15], APACHE III score[16,17], Multiple Organ Dysfunction Score (MODS)[18], Simplified Acute Physiology Score (SAPS) II[19], Sequential Organ Failure Assessment (SOFA) score[20]. Although these severity scores were valid to predict mortality in ICU patients, they might not predict prolonged ICU length of stay. In addition, most of the scores were studies in medical ICU, post cardiac and traumatic surgery with different length of stay. These can be inaccurate when applied to patients in the general surgical intensive care unit[3,11,21,22].

To help predict which patient might have a prolonged ICU stayed, this study was designed to explore the incidence, clinical factors, severity score and outcome (as ventilator day, total ICU length of stay) associated with prolonged length of stay $\geq$3 days.

Material and Method

After approval from Siriraj Ethical Committees and patients' consent, this prospective observational study was done on 948 patients, age >18 years who underwent elective or emergency non-cardiac, surgery requiring general and/or regional anesthesia and needed to be admitted postoperatively to the general SICUs (ICU Siammitra and ICU Salad-Samung) at Siriraj Hospital (a 2,400 beds, tertiary referral university hospital in Bangkok, Thailand) between January and December 2005. These were 14-bed, closed surgical ICUs with full-time intensivists. The sample size was calculated from our pilot, 3-month observational study, which showed the incidence of prolonged ICU stay $\geq$3 days was 19%. Patients who underwent cardiothoracic, neurosurgical traumatic surgery and died within 3 days of ICU admission were excluded from this study. Staying in ICU $\geq$3 days was defined as a prolonged stay as this was the 90th percentile of ICU day of patients admitted to this ICU and this is the time period that a patient, with a given physiologic profile, will have a higher predicted mortality, early nosocomial infection such as ventilator associated pneumonia, line infection can occur and more complex physiological problem can occur if patients still are stay in the ICU[11]. Most of the prolonged stays in this ICU were due to prolonged ventilation, hemodynamic instability, serious arrhythmias and need of renal replacement therapy (RRT) in the ICU. The indication for ICU admission, and discharge in this SICU, followed "the Guideline for ICU Admission, Discharge, and Triage"[23]. Discharge time was the time order to discharge given by the physician.

The following clinical variables that might be the predictors of prolonged ICU length of stay $\geq$3 days were carefully recorded included: age, gender, body mass index (BMI), underlying medical problems, preoperative ASA physical status, functional class (>4 or $\leq$4 METS), preoperative hematocrit and serum albumin, types of operation, (elective or emergency operation), anesthesia and surgical complications occurring in the operating room, surgery with diagnosis of malignancy, types of ICU admission (planned or unplanned), indication for ICU admission, clinical of sepsis on ICU admission[24], time of admission and time order to discharge, type of postoperative pain management and severity score as APACHE II, APACHE III, SOFA, SAPS II and MODS scores at day 1 and day 3 of ICU admission were also calculated and recorded.

Data analysis

Data were analyzed by using SPSS 15.0 program. For univariate analysis, a Chi-square test was used for categorical data to test the association between the variables and prolonged length of stay. For quantitative variables, unpaired t-test and Man-Whitney test were used for normally and non-normally distributed data, respectively. With regard to multivariable analysis, an unconditional multiple logistic regression analysis was employed to assess the effect of each variable after controlling for the effects of other associated variable. Adjusted odds ration (OR) and its 95% confidence interval (95% CI) were reported along with *p*-value. A two sided significant level of 0.05 was used for all analyses. Quantitative variables are presented as mean $\pm$ SD.

Results

During the study period, 948 patients were recruited in this study. Mean age of the patients was 62.8$\pm$16.3 (range 18-97) years, BMI 1.6$\pm$0.2 (range 1.0-2.5) kg/m^2, pre-operative hematocrit 33.6$\pm$5.3% and

serum albumin 2.9±0.6 mg/dL. Forty percent of the patients were from general surgical service and 45.1% were female. Most of the underlying medical problems were hypertension (42.5%) and malignancy (41.9%). Half of the patients were classified as functional class >4 MET and ASA physical status class II. Most of the patient underwent elective surgery (87.6%) and had a planned ICU admission (79.4%). Fourteen percent and 10% had complications related with anesthesia and surgery, respectively. Forty-four percent were out of regular hour ICU admission, 23.5% had postoperative epidural analgesia and 10.2% had sepsis on admission.

Prolonged ICU stay patients accounted for 189 (20.1%). Table 1 shows patients' baseline characteristics. In Table 2 and 3, when compared with short stay patients, significant different factors between group in the univariate analysis for prolonged ICU stay (≥3 days) were BMI (p = 0.02), preoperative hematocrit (p<0.001), preoperative serum albumin (p<0.001), female (p = 0.013), functional class ≤4 MET (p = 0.003), underlying liver impairment (p = 0.003), ASA physical status IV (p<0.001), surgery with diagnosis of malignancy (p = 0.03), emergency type of surgery (p<0.01), had surgical complication (p<0.01), had anesthetic complication (p<0.01), unplanned ICU admission (p<0.01), admission with the indication of respiratory support and unstable hemodynamic plus respiratory support (p<0.01), presented with sepsis on ICU admission (p<0.01), postoperative epidural analgesia (p = 0.01) and out of regular service hour admission (p<0.01).

By using multiple logistic regression analysis after co-linearity testing between variables, the regression coefficient showed significant predictors of prolonged ICU stay (≥3 days) (Table 4) including low preoperative serum albumin (<2.6 mg/dL) (p = 0.023), emergency surgery (p = 0.003), having surgical complications (p = 0.017), having anesthetic complications (p = 0.017), patients who needed respiratory support (p<0.001) and unstable hemodynamic plus respiratory support (p<0.001) and presented with sepsis on ICU admission (p = 0.003). While high pre-operative hematocrit (≥34%) (p = 0.035) was a significant protective factor of prolonged stay ≥3 days.

For severity scores, among preoperative ASA physical status and others severity score as: APACHE II, APACHE III, SOFA, SAPS II and MODS at day 1 and day 3 which could predict this prolonged stay (≥3 days). Data from univariate analysis (Table 3) shows ASA physical status class IV (p<0.01), emergency ASA physical status (p<0.05), APACHE III score day 1 (p = 0.03) were significantly different between short

Table 1. Patients baseline characteristic

Variables	Values
Age in years (SD)	62.8 (16.3)
Body mass index (kg/m^2) (SD)	1.6 (0.2)
Preoperative hematocrit in percent (SD)	33.6 (5.3)
Preoperative albumin level, mg/dL, (SD)	2.9 (0.6)
Female (%)	428 (45.1)
Surgical service (%)	
General surgery	389 (41.0)
Urology	173 (18.3)
Orthopedics	167 (17.6)
Ear-nose-throat	86 (9.1)
Obstetrics-gynecology	57 (6.0)
Head-neck	43 (4.5)
Others	33 (3.5)
Surgery with diagnosis of malignancy (%)	398 (41.9)
Medical problem comorbidity (%)	
Central nervous systems	113 (11.9)
Cardiovascular systems	539 (56.9)
Hypertension	403 (42.5)
Coronary artery diseases	138 (14.6)
Vascular diseases	109 (11.5)
Respiratory problems	225 (23.7)
Renal impairment	194 (20.5)
Liver impairment	67 (7.1)
Endocrine problem	233 (24.6)
Functional class (%)	
>4 MET	858 (90.5)
≤4 MET	90 (9.5)
ASA physical status (%)	
I	72 (7.5)
II	513 (54.1)
III	316 (33.3)
IV	36 (3.8)
V	4 (4.2)
ICU admission planning (%)	
Plan, scheduled surgery	753 (79.4)
Plan, emergency surgery	117 (12.3)
Unplanned from surgical complication	36 (3.9)
Unplanned from anesthetic complication	42 (4.4)
Indication for ICU admission (%)	
Postoperative monitoring	507 (53.4)
Respiratory support	247 (26.1)
Unstable hemodynamic	12 (1.3)
Unstable hemodynamic and respiratory support	143 (15.1)
Emergency type of surgery (%)	118 (12.4)
Complication associated with anesthesia (%)	126 (13.3)
Complication associated with surgery (%)	93 (9.8)
Out of regular hour admission (%)	416 (43.9)

Table 2. Univariate analysis of continuous predictors and outcome of prolonged ICU stay

Variables (mean ± SD)	Prolonged stay (≥3 days)	Short stay (<3 days)	*p*-value
Age (year)	63.40±16.20	62.70±16.20	0.590
Body mass index (kg/m^2)	22.20±4.50	23.10±4.60	0.002
Preoperative hematocrit (%)	32.00±5.8	34.00±5.10	<0.001
Preoperative serum albumin (mg/dL)	2.60±0.5	3.00±0.50	<0.001
Length of stay in ICU (days)	16.90±26.6	1.10±0.60	<0.001
Ventilator day (days)	10.20±18.3	0.40±0.10	<0.001
APACHE II day 1	8.14±4.03	8.73±4.73	0.114
APACHE II day 3	7.82±4.19	8.26±5.33	0.628
APACHE III day 1	29.18±15.11	32.27±17.27	0.025
APACHE III day 3	27.74±16.57	32.32±17.93	0.145
MODS day 1	0.90±1.58	1.22±2.13	0.059
MODS day 3	1.78±2.88	2.08±2.79	0.557
SOFA day 1	1.49±2.09	1.80±2.59	0.122
SOFA day 3	2.63±3.08	3.00±3.48	0.560
SAPS day 1	19.47±9.17	21.24±11.80	0.104
SAPS day 3	21.05±10.36	22.88±14.08	0.453

Table 3. Univariate analysis of categorical predictors and outcome of prolonged ICU stay

Variables	Odd ratio (95% CI)	*p*-value
Female	1.15 (1.09-2.06)	0.013
Age (>65 years)	1.31 (0.95-1.81)	0.101
Functional class ≤4 MET	2.05 (1.28-3.30)	0.003
Underlying liver impairment	2.23 (1.31-3.80)	0.003
ASA classification		
ASA class II, III	1.37 (0.69-2.73)	0.150
ASA class IV	16.40 (6.2-42.9)	<0.001
Emergency surgery	6.07 (4.04-9.12)	<0.001
Surgery with diagnosis of malignancy	6.70 (6.50-6.97)	0.033
Having surgical complication	3.03 (1.93-4.75)	<0.001
Having anesthetic complication	1.95 (1.40-2.71)	<0.001
Indication for ICU admission		
Respiratory support	1.85 (1.57-4.07)	<0.010
Unstable hemodynamic & respiratory support	3.02 (2.18-6.18)	<0.010
Unplanned ICU admission	1.40 (1.22-38.52)	<0.001
Sepsis on admission	4.88 (3.15-7.56)	<0.001
Not use postoperative epidural analgesia	2.78 (1.27-6.11)	0.009
Out of regular service hours admission	4.81 (2.63-8.79)	<0.001

and prolonged stay. While MODS day 1 almost associated with prolonged stay (p = 0.06). By using multiple logistic regression analysis, ASA physical status class IV (OR 6.5) and emergency ASA (OR 4.5) were significant severity score associated with prolonged ICU stay (≥3 days).

With the outcome of this study, prolonged stay patients had significant longer ventilator days (p<0.01) and ICU length of stay (p<0.01) (Table 2).

Discussion

In this study, most of the study patients were aging population (mean age of 63 years old), had low BMI (mean of 1.6 kg/m^2) and low preoperative serum

Table 4. Predictors of prolonged ICU length of stay by Multiple Logistic Regression

Variables	Adjusted odds ratio (95% CI)	*p*-value
Model I preoperative predictors*		
Preoperative hematocrit ≥34%	0.96 (0.93-0.99)	0.035
Preoperative serum albumin <2.6 mg/dL	1.57 (1.45-2.30)	0.023
Emergency surgery	2.32 (1.32-4.07)	0.003
Having surgical complications	1.95 (1.13-3.37)	0.017
Having anesthetic complications	1.65 (1.09-2.50)	0.017
Respiratory support	2.95 (1.87-4.67)	<0.001
Unstable hemodynamic and respiratory support	4.35 (2.58-7.28)	<0.001
Sepsis on admission	2.32 (1.32-4.03)	0.003
Model II severity predictors		
ASA class II & III	1.35 (0.66-2.74)	0.408
ASA IV	6.50 (2.31-18.28)	<0.001
Emergency ASA physical status	4.52 (2.86-7.12)	<0.001
APACHE III day I	0.99 (0.97-1.00)	0.119
MODS day I	0.88 (0.73-1.08)	0.231

* The model adjusted the severity of diseases by ASA classification

albumin level (mean of 2.9 mg/dL). Most of the patients were in the group of moderate severity (functional class >4 MET and ASA physical status class II) underwent elective surgeries in the abdomen with the diagnosis of malignancy. Half of the patients were admitted for postoperative monitoring and 15% were admitted for hemodynamic resuscitation and respiratory support.

The incidence of prolonged ICU stay (≥3 days) in general SICU was 20.1%. This incidence was quite closed to the previous studies, despite different population[8-10]. Anyhow, incidence of prolonged stay also varies among definition, type of population but this can be used as a maker for quality care improvement. Low preoperative serum albumin (<2.6 mg/dL) was a significant predictor of prolonged ICU stay and underlying liver disease was also associated with prolonged ICU stay. As albumin is an important part of physiologic properties in the body and low serum albumin level had been reported to be associated with higher mortality and prolonged ICU stay[25]. Improved baseline serum albumin level before elective surgery might decrease prolonged ICU length of stay.

Higher hematocrit level of ≥34% helped decrease ICU length of stay <3 days [odd ratio (OR) 0.9]. This high hematocrit might decrease number of blood transfusion and more reported about worse outcome associated with blood transfusion in critically ill patient[26]. Anyhow, number of intraoperative blood transfusion, serum albumin and hematocrit on ICU admission did not include in this study.

Low BMI (mean 22.2 kg/m^2) was associated with prolonged ICU stay while the used of postoperative epidural analgesia was associated with short ICU stay. But these predictors were not significant in multivariate analysis. Age was not significantly different between short and long stay in this study despite most of the study population were aging population (mean age 63 years).

This study also confirmed that patients who had low functional class (≤4 MET), underwent emergency surgery (OR 2.3), had anesthetic (OR 1.7) or surgical (OR 2.0) complications were significantly associated with prolonged ICU stay. Also, surgery with the diagnosis of malignancy, unplanned ICU admission and out of regular hours admission were associated with prolonged ICU stay. More care should be considered in patient undergoing emergency surgery, and to prevent anesthetic or surgical complication along with the cares after injury.

Patients who needed respiratory and respiratory plus unstable hemodynamic were significantly associated with prolonged ICU stay. Including sepsis patients, who usually need respiratory support and hemodynamic resuscitation were also significantly associated with prolonged ICU stay. Despite this result was close to previous study that sicker patient may need more time in ICU[3,5,6,10]. ICU resources needed to be relocated to this group of

patients.

About severity scores to predict prolonged ICU stay, in this study ASA physical status which is a preoperative evaluation of patient physical status from the American Society of Anesthesiologist for patient undergoing anesthesia and surgery[12] could significantly predict prolonged ICU stay (≥3 days) when compared with others severity score despite APACHE II and MODS at day one almost predicted prolonged ICU stay. Higher ASA physical status class associated with more physical disturbance and addition of "E" defined ASA classification in emergency surgery. In this study, ASA physical status IV which is "a patient with severe systemic disease that is a constant threat to life"[13] could significantly predict the prolonged SICU stay ≥3 days with OR 6.5 and each of ASA that associated with emergency surgery (emergency ASA) had OR of 4.5.

Patients with prolonged ICU stay had significantly higher ventilator hours and ICU length of stay. Anyhow, this study did not include the data of ICU and hospital mortality as many factors could interfere with ICU and hospital mortality.

Conclusion

One fifth of the study patients had prolonged ICU stay. These patients also had longer ventilator days and ICU length of stay. Patients with low preoperative serum albumin (<2.6 mg/dL), ASA physical status class IV, underwent emergency surgery, having anesthetic or surgical complications, having clinical of sepsis on ICU admission and admission for respiratory support especially with hemodynamic resuscitation, were significantly associated with prolonged ICU stay. The high pre-operative hematocrit (≥34%) was a protective predictor for prolong ICU stay.

What is already known on this topic?

Significant clinical predictors of prolonged ICU length of stay (≥3 days) in patients undergoing major noncardiac surgery were low preoperative serum albumin (<2.6 mg/dL), underwent emergency surgery, had anesthetic or surgical complications, had clinical sepsis on ICU admission, admission for respiratory support especially with hemodynamic instability. While high pre-operative hematocrit (≥34%) significantly decrease ICU length of stay and postoperative epidural analgesia may decrease ICU length of stay. Among the severity scores, ASA physical status and emergency ASA were significant predictors of ICU length of stay ≥3 days while APACHE III and MODS day I were different between prolonged and short stay patients. Prolonged ICU length of stay significantly increased ventilator hours and ICU length of stay.

What this study adds?

In patients undergoing major noncardiac surgery, high preoperative hematocrit had less incidence of prolonged ICU stay. Compare among severity scores, ASA physical status and emergency ASA physical status were more accurate to predict prolonged ICU stay.

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Potential conflicts of interest

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ปัจจัยเสี่ยงที่มีผลให้ผู้ป่วยต้องได้รับการรักษาในหอผู้ป่วยหนักทางศัลยกรรมทั่วไปของโรงพยาบาลมหาวิทยาลัย ≥3 วัน

สุณีรัตน์ คงเสรีพงศ์, นฤนาถ โลมารัตน์, ศราวุธ ธรรมธนวิทย์, ชัยอนันต์ โสดาพักตร์, ต่อพงษ์ วงศ์วิเศษ, สุทธิมา เกื้อเพชร, สุชาดา แซ่เฮง, จุฬาลักษณ์ โกมลตรี

วัตถุประสงค์: เพื่อศึกษาถึงอุบัติการณ์ ผลลัพธ์ และปัจจัยทางคลินิกที่เกี่ยวข้อง รวมถึงที่มีความเกี่ยวข้องกับความรุนแรงของโรคที่สามารถทำนายว่าผู้ป่วยนั้นๆ ต้องอยู่รับการรักษาในหอผู้ป่วยหนักศัลยกรรมทั่วไป ≥3 วัน

วัสดุและวิธีการ: การศึกษานี้เป็นการศึกษาไปข้างหน้าที่เข้ารับการรักษาในหอผู้ป่วยผู้ป่วยหนักศัลยกรรมทั่วไปของโรงพยาบาลมหาวิทยาลัยตติยภูมิ ผู้ป่วยที่ได้รับการผ่าตัดหัวใจและทรวงอก ผ่าตัดสมอง ผ่าตัดอุบัติเหตุ และเสียชีวิตภายใน 3 วันหลังรับเข้ารับการรักษาจะถูกคัดออก จากการศึกษาบันทึกข้อมูลพื้นฐานของผู้ป่วย ปัจจัยพยากรณ์ก่อนการผ่าตัดระดับความรุนแรงของโรค (APACHE II, APACHE III, SOFA, SAPS II และ MODS) ในวันที่ 1 และ วันที่ 3 ของการรับเข้ารักษาและผลลัพธ์ของการรักษา

ผลการศึกษา: ผู้ป่วยจำนวน 948 คน เข้าสู่การศึกษา พบว่าอุบัติการณ์ของการที่ผู้ป่วยต้องรับการรักษาในหอผู้ป่วยหนักคือ ร้อยละ 20.1 ผู้ป่วยที่ครองเตียงในหอผู้ป่วยหนักนานจะสัมพันธ์กับระยะเวลาของการใช้เครื่องช่วยหายใจอย่างมีนัยสำคัญ ($p<0.001$) ในการวิเคราะห์พหุถดถอยโดยใช้ตัวแปรคาดก่อนการผ่าตัด พบว่าปัจจัยที่เกี่ยวข้องกับการที่ผู้ป่วยต้องรับการรักษาในหอผู้ป่วยหนักนานคือ ระดับ serum albumin ก่อนผ่าตัดที่ต่ำ (<2.6 มก./ดล.) ($p = 0.023$), ระดับฮีมาโตคริตก่อนผ่าตัดที่ต่ำกว่า ร้อยละ 34 ก่อนผ่าตัด ($p = 0.035$), รับการผ่าตัดฉุกเฉิน ($p = 0.003$), มีภาวะแทรกซ้อนของการผ่าตัด ($p = 0.017$), มีภาวะแทรกซ้อนทางวิสัญญี ($p = 0.017$), ต้องได้รับการช่วยการหายใจและ/หรือระบบไหลเวียนที่ไม่คงที่ ($p<0.001$) ในแบบจำลองพหุ ถดถอยโดยใช้ตัวแปรในส่วนของความรุนแรงของโรคพบว่าเฉพาะการวัดด้วย ASA ระดับ IV ($p<0.001$) และ emergency ASA ($p<0.001$) สามารถทำนายว่าผู้ป่วยนั้นๆ ต้องอยู่รับการรักษาในหอผู้ป่วยหนักนาน

สรุป: ประมาณ 1 ใน 5 ของผู้ป่วยที่เข้ารับการรักษาในหอผู้ป่วยหนักศัลยกรรมทั่วไปต้องเข้ารับการรักษา ≥3 วัน ผู้ป่วยที่มีระดับ serum albumin ก่อนผ่าตัดที่ต่ำ (<2.6 มก./ดล), มีระดับฮีมาโตคริตก่อนผ่าตัดที่ต่ำกว่าร้อยละ 34, มี ASA physical status IV, ได้รับการผ่าตัดฉุกเฉิน มีภาวะแทรกซ้อนของการผ่าตัดหรือทางวิสัญญี มีภาวะเซฟสิสเข้าเข้ารับการรักษาในหอผู้ป่วยหนัก และผู้ป่วยที่ต้องได้รับการช่วยหายใจ และ/หรือมีระบบไหลเวียนไม่คงที่ มีความสัมพันธ์อย่างมีนัยสำคัญกับที่มีต้องเข้ารับการรักษาในหอผู้ป่วยหนัก ≥3 วัน