LETTER TO THE EDITOR

ASA and Goldman Scoring Systems in Prediction of Open Cholecystectomy Surgeries

Dear Editor,

Various scoring systems are used to evaluate risks of surgeries, but an appropriate scoring system for predicting the post-surgical complications should not only be simple, easy to calculate, accessible in different hospitals and centers, and proper for various operations but also it must be able to precisely assess the complications under question.[1,2] The ASA scoring system developed in 1941 was reported to be an efficient system in predicting the mortality and to some extent morbidity rates in patients undergoing surgical operations.[3] Later on in 1977, the multi-factor Goldman Index was designed, aiming at predicting the prevalence of cardiac complications, and the major cause of post-operation mortality in non-cardiac surgeries. This score is calculated, using the patient's age, history of underlying cardiac diseases, electrocardiogram findings, laboratory results and certain clinical observations.[4]

Several studies have assessed the efficacy of either scoring systems regarding the type of surgery performed.[2,4,5] There are controversial results regarding the efficacy of these systems in evaluating the operational risks.[6] The present study was, therefore, designed to assess the relationship between the patients' physical status considering ASA and Goldman scoring systems and the risk of developing complications or mortality following an open cholecystectomy surgery, one of the most common surgical operations usually performed on old individuals suffering from certain underlying complications with the objective of identifying the best scoring system in predicting the outcome of such an operation.

As a result, the patients undergoing open cholecystectomy in a teaching hospital from 1997 to 2006 were enrolled in this retrospective, cross-sectional study. The patients' demographic data, clinical signs and symptoms, the pre-surgical and surgical findings and the occurrence of possible postoperative complications were extracted from the patients' medical records. Moreover, information on the patients' past medical history, particularly cardiac and pulmonary diseases, previous surgeries and pre-surgical complications, and chest X-ray and electrocardiogram reports along with the results of complete blood count, biochemistry, liver enzymes and coagulation factors as well as the artery blood gas tests and the blood electrolytes (sodium, potassium and magnesium) were gathered. Considering the above-mentioned data, ASA and Goldman scores were calculated for each patient.

For analyzing the qualitative and quantitative variables, Chi-Square and t-test were used, respectively. The ASA and Goldman classifications of the patients were calculated by Man Whitney; Spearman's rank correlation test was used to assess the relationship between the ASA and Goldman score of each patient. One hundred forty one patients were enrolled in the study; 86 (61%) of whom were females. The mean age of the patients was 58.5±6.2. About half of the patients were above 50 years old. It is to be noted that 88% of the operations underwent elective surgeries and 12% emergency ones.

The symptoms and para-clinical findings of the patients are summarized in Table 1. In the review of the operation reports, a significant inflammation in the gall bladder wall was reported in 109 of the cases (77.3%). Complications such as gangrene and empiema were observed in 10% and 5.7% of the patients, respectively. The patients' scores regarding ASA I to IV scoring system were 4.5%, 23.4%, 9.2% and 2.8% respectively. These figures for Goldman scoring were 77.3%, 19.1%, 3.5% and 0% respectively. There was a significant relationship between ASA and Goldman scores ($r=0.85$, p value<0.001). Also, ASA and Goldman scores were correlated with fatal complications (p value<0.001); this correlation was highly significant for ASA scores less than II ($X2=153.4$, p value<0.001). The combination of ASA and Goldman scores led to optimal results.

Seven cases died within 4 weeks following the surgery. These patients were classified into ASA II (3 patients), ASA III (2 patients) and ASA IV (2 patients). Comparing the ASA and Goldman scores in these cases, it was revealed that the Goldman score in the 2 patients with ASA score III was II and III; as t to the 2 cases with ASA score IV, Goldman score was III. The present study showed that ASA and Goldman similarly correlated with the pre-operative risk evaluation; therefore, they can be considered as

Table 1: Clinical signs and para-clinical findings of the patients participating in this study

Signs, symptoms	Tenderness		94.3
	Pain		90
	Vomiting, nausea		75
	Morphy sign		50.4
	Hepatitis		18
	Tachycardia		18
	Fever (>38.5)		10
Laboratory findings	Leukocytosis (>10000)		64
	Hepatic enzyme increase		48
	Increased alkaline phosphatase		27
	Increased bilirubin level	Total	31
		Direct	25.5
	Stone	Gallbladder	81.3
Abdominal sono-graphy findings		Coleduk	10
	Gallbladder wall thickness		64.2

proper criteria for predicting post-operative mortality. The best factor in predicting the patients' survival rate was ASA ≤2 (mortality: 0.02%). Although cardiac complications were the most prevalent cause of mortality, unlike the ASA system, Goldman could not solely make efficient predictions on post-operative mortality rates. Considering the above-mentioned findings, it can be concluded that while ASA is a better system to predict the mortality rate following an operation, the combination of ASA and Goldman scores increases the power.

Keywords: ASA scoring system; Goldman scoring system; Open cholecystectomy; Mortality; Morbidity

Conflict of interest: None declared.

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Received: July 18, 2008 Accepted: February 2, 2009

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