

The term “evidence-based medicine” was first coined by Sackett and colleagues¹ as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.” The key to practicing evidence-based medicine is applying the best current knowledge to decisions in individual patients. Medical knowledge is continually and rapidly expanding and it is impossible for an individual clinician to read all of the medical literature. For clinicians to practice evidence-based medicine, they must have the skills to read and interpret the medical literature so that they can determine the validity, reliability, credibility and utility of individual articles. These skills are known as critical appraisal skills. Generally, critical appraisal requires that the clinician have some knowledge of biostatistics, clinical epidemiology, decision analysis and economics as well as clinical knowledge.

The Canadian Association of General Surgeons and the American College of Surgeons jointly sponsor a program entitled “Evidence-Based Reviews in Surgery (EBRS),” supported by an educational grant from Ethicon Inc and Ethicon Endo Surgery Inc. The primary objective of this initiative is to help practicing surgeons improve their critical appraisal skills. During the academic year, eight clinical articles are chosen for review and discussion. They are selected not only for their clinical relevance to general surgeons but also because they cover a spectrum of issues important to surgeons; for example, causation or risk factors for disease, natural history or prognosis of disease, how to quantify disease

(measurement issues), diagnostic tests and the diagnosis of disease, and effectiveness of treatment. Both methodologic and clinical reviews of the article are performed by experts in the relevant areas and posted on the EBRS website; a listserv discussion is held where participants can discuss the monthly article. Fellows and candidates of the College can access Evidence-Based Reviews in Surgery through the American College of Surgeons website (www.facs.org). All journal articles and reviews are available electronically through the website. We have a library of articles and reviews dating back to October 2000, which can be accessed at any time. Each October a new set of articles and reviews are available each month until May. Surgeons who participate in the current (modules) packages can receive CME credits by completing a series of MCQ. For further information about EBRS the reader is directed to the ACS website or should email the administrator, Marg McKenzie at mmckenzie@mtsinai.on.ca.

In addition to making the reviews available through the ACS and CAGS websites, 4 of the reviews are published in condensed versions in the *Canadian Journal of Surgery* and the other four will be published in the *Journal of the American College of Surgeons* each year.

REFERENCE

1. Evidence Based Medicine Working Group. Evidence-based medicine. *JAMA* 1992;268:2420–2425.

Selected Articles

Simple scoring system for the prediction of the prognosis of severe acute pancreatitis

Ueda T, Takeyama Y, Yasuda T, et al. *Surgery* 2007;141(1):51–58

Reviewed by

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Abstract

Objective:

To develop a simple scoring system to predict outcome in patients with severe acute pancreatitis (SAP).

Design:

Retrospective cohort study.

Setting:

Two university centers in Japan.

Patients:

One hundred thirty seven patients treated for SAP since 1990.

Methods:

Data on 22 clinical, radiological and biochemical variables were collected soon after presentation of 137 patients with severe pancreatitis. Both univariate and multivariate analysis were performed to determine which were independent variables associated with poor outcome. Receiver operator characteristic (ROC) curves were constructed for each variable to determine the optimum cutoff level. Also, ROC curves were constructed, and the area under the curve calculated for the final SPS instrument as well as the Ranson Scoring System, APACHE II, Glasgow Score and the Japanese Scoring System (JSS).

Main Results:

Eleven variables were significant on univariate analysis. Multivariate analysis revealed three independent factors

that were predictive of outcomes: BUN ($<$ or \geq 25 mg/dL); LDH ($<$ or \geq 900 IU/dL) and CE-CT (necrosis or no necrosis). These 3 variables were included in a scoring system (SPS) with possible scores ranging from 0 to 3. Mortality rates were 2% in patients with a score of 0; 18% in patients with a score of 1; 48% in patients with a score of 2 and 67% in patients with a score of 3. Infection and organ dysfunction rates were 2%, 13%, 48% and 53% respectively, for scores of 0, 1, 2, and 3. The area under the curve for the SPS was comparable to the other scoring systems.

Conclusion:

SPS is simple and provides sufficient predictive power to facilitate clinical decision making.

Commentary:

The study reported by Ueda et al included patients with pancreatitis from a single institution and the study was proposed to develop a simple scoring system for patients with severe acute pancreatitis. The goal was to have a scoring system that could be easily applied in the clinical setting to identify, on admission, those patients who were likely to develop extremely severe disease. Other scoring systems for pancreatitis (Ranson, Glasgow, APACHE I and II) are used mostly to differentiate between mild and severe disease and may not be as useful in predicting prognosis. For this study, the authors identified retrospectively 137 patients with severe acute pancreatitis as defined by the Japanese Severity Score (JSS) of greater than or equal to 2. The JSS assigns points for clinical signs (shock, respiratory failure, mental disturbance, severe infection, hemorrhagic diathesis, SIRS score, age) and laboratory data (base deficit, hematocrit, BUN, creatinine, calcium, blood sugar, PaO₂, LDH, total protein, prothrombin time, platelet count and CT) to calculate the score. Potential prognostic factors which differentiate survivors from non-survivors were evaluated, first with univariate analyses to identify significant factors. Then the area under the curve was calculated to determine optimum cutoff levels for each factor. Finally multivariate testing was performed to determine the final scoring system. The final score (SPS) consists of three factors available on admission: BUN (\leq or \geq 25 mg/dL), LDH (\leq or \geq 900 IU/L), and pancreatic necrosis on contrast enhanced CT. The SPS was shown through further analyses to be a good predictor of both mortality and clinical course (development of multi-system organ failure and infection).

1. The authors had an ambitious goal, trying to develop a simple, easy to use system to identify those patients with severe acute pancreatitis who are most at risk for developing multisystem organ failure, infection, and risk for dying from their disease. The Ueda score can be compared with the more classically taught (at least in North America) Ran-

son's score. Both scores were developed using essentially retrospective data and used somewhat similar analytic methods, although the complex regression analyses performed by Ueda and colleagues were not performed by Ranson (Ranson JHC, et al. Prognostic signs and the role of operative management in acute pancreatitis. *Surg Gynecol & Obstet* 1974;139:69–81). Despite the three decades since publication, the Ranson score holds up fairly well in comparison with the SPS (Ranson vs. SPS for predicting mortality: sensitivity 70% v 80%, specificity 82% v. 76%, positive predictive value 63% v. 58% and negative predictive value 86 v. 90%).

Ueda and coworkers concluded that "SPS is simple and provides sufficient predictive power to facilitate clinical decision making. Patients with high SPSs (score 2 and 3) should be treated as patients with extremely severe disease in a highly specialized institution." While the SPS itself is simple and easy to use, the authors forget that the surgeon must first determine if the patient meets criteria for severe pancreatitis (defined in this study as a JSS \geq 2). The JSS includes 18 clinical and laboratory data points! In addition, the data presented do not test the hypothesis that transfer to a highly specialized center improves outcomes.

There are several hot issues that make "real-time" risk prediction and/or adjustment important in the 21st century. First, there are many guidelines in surgery for prophylaxis of common complications (antibiotics for surgical site infection, antithrombotic therapy for thromboembolic events, beta-blockade for cardiac events) that require some amount of judgment in their application. For all these, there is a balance among the risks of complication, the risks and benefits of the prophylactic agent, and the ability to apply such to a particular patient (eg, difficult to provide adequate beta-blockade in a patient in need of an emergent procedure).

There have been multiple attempts in all areas to update older risk scores (Goldman's criteria for cardiac events in non-cardiac surgery) or develop new ones as we see here. A reasonable debate at this point given the increasing penetration of electronic medical records is whether it is most important to develop a parsimonious, simple score versus a complex model that can be calculated by software and sent to the clinician as an "alert" via the EMR. The technology to support this type of predictive model will be available in the short term, yet prospective studies are needed of both the parsimonious scores and the more complex computer modeled scores and their abilities to improve patient outcome rather than just assessing compliance with recommendations and guidelines.

Although Ueda and colleagues were successful in developing a score that is at least as useful as other, more complex scores, they do acknowledge the need to use another scor-

ing system to stratify patients into those with acute disease, therefore negating the simplicity of their score. They probably should have tested their scoring system on all patients with acute pancreatitis (including those with JSS scores of 0 or 1) to see how it holds up against its complex competitors. This is extremely important as one of the three factors in the SPS is a CE-CT, something that is not routinely obtained in patients with less severe pancreatitis. Because of this, it is unlikely, despite its simplicity, to replace other time-tested scores in either clinical care or research.

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