Feasibility of Applying Data Mining Techniques for Predicting Technical Difficulties During Laparoscopic Cholecystectomy Based on Routine Patient Work-Up in a Small Community Hospital

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References:

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Abstract:

Background/Aims: Predicting technical difficulties in laparoscopic cholecystectomy (LC) in a small regional hospital increases efficacy, cost-benefit and safety of the procedure. The aim of the study was to assess whether it is possible to accurately predict a difficult LC (DLC) in a small regional hospital based only on the routine available clinical work-up parameters (patient history, ultrasound examination and blood chemistry) and their combinations. Methodology: A prospective, cohort, of 369 consecutive patients operated by the same surgeon was analyzed. Conversion rate was 10 (2.7%). DLC was registered in 55 (14.90%). Various data mining techniques were applied and assessed. Results: Seven significant predictors of DLC were identified: i) shrunken (fibrotic) gallbladder (GB); ii) ultrasound (US) GB wall thickness 4 mm; iii) >5 attacks of pain lasting >5 hours; iv) WBC 10x10^9 g/L; v) pericholecystic fluid; vi) urine amylase >380 IU/L, and vii) BMI 30kg/m2. Bayesian network was selected as the best classifier with accuracy of 94.57, specificity 0.98, sensitivity 0.77, AUC 0.96 and F-measure 0.81. Conclusion: It is possible to predict a DLC with high accuracy using data mining techniques, based on routine preoperative clinical parameters and their combinations. Use of sophisticated diagnostic equipment is not necessary.

Keywords:

Difficult laparoscopic cholecystectomy; Bayesian network.