Incision infection risk assessment in laparoscopic acute appendectomy based on dynamic fault tree

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Abstract

Patient safety has become a hot topic in healthcare since the industry is a field of high-technique and filled with medical errors, which necessitate the medical risk assessment. A lot of models have been introduced to medical risk assessment, among which fault tree analysis (FTA) is one of the most popular methods. However, many researches indicate that most risk factors may occur in everyday clinical processes which can be regarded as a dynamic interaction between patients, providers, and devices. Traditional FTA has deficiencies in handling these problems due to its determinacy. In this paper, a dynamic fault tree is suggested to extending FTA to incorporate dynamic elements by means of adding extra logic gates. Thus, dynamics in healthcare such as sequence-dependent events, priorities of failure events and so forth can be solved effectively. We apply the proposed model to assess the probability of incision infection in laparoscopic acute appendectomy in a large hospital. The feasibility and effectiveness of the proposed method is illustrated by comparing with the traditional FTA.

Keywords
Medical risk, dynamic risk assessment, dynamic fault tree, incision infection, patient safety