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Paper Poster Session
Surgical site infection

Development of an automated support system for the detection of surgical site infections at the regional university hospital of Nancy: pilot study

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Background: Surgical Site Infections (SSI) are the 3rd most common hospital acquired infections in France. Surveillance is essential to prevent them despite its complexity and time consuming.

To facilitate and to alleviate the implementation of this monitoring, the use of Data Mining which operates medical and administrative data as unique source seems interesting. A pilot study was performed to evaluate the possibility to develop an automated detection of SSI in a university hospital.

Material/methods: The study was conducted between september and november 2014 retrospectively from medical and administrative data. Patients who received an intervention of digestive surgery and neurosurgery were included.

We compared three methods of Data Mining to assess their feasibility to retrieve relevant criteria of suspected SSI in a single data source, the hospital information system that contains microbiological, administrative and medical-surgical data related to each stays for each patient.

Association rules methods, decision trees and classification rules were tested to identify the most appropriate method to our objective. The gold standard corresponded to the diagnosis of SSI by surgeons.

Results: Our database included 278 interventions, called individuals. It included 807 variables with 14 variables related to SSI's preoperative risk factors, and 793 variables related to individual care pathway.

A total of 21 surgical site infections have been validated by surgeons that lead to a prevalence of 7.5%.

Similar rules have been found with the three methods compared. The rules obtained with the method of association rules were relevant. Moreover, both already known risk factors for SSI such as older age, presence of cancer or emergency surgery and new predictors derived from codes issued from the 10th International Classification of Diseases were found.

The algorithms of decision trees methods and classification rules had a very good overall sensitivity with areas under the ROC curve ranging from 57.9% to 70.8%. The sensitivity concerning the non-

occurrence of SSI was more important than to detect surgical site infections so that these methods are less relevant than those association rules.

Conclusions: The use of medical administrative data from the electronic health record as the only source, in data mining is a relevant method to detect SSI. A larger number of interventions and the improvement of the selection of variables should be taken into account to optimize the relevance rules obtained.