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Nine-year downward trends in surgical site infection rate in southeast France (1995–2003)

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Summary The aim of this study was to estimate temporal trends in the incidence of surgical site infection (SSI) using a large SSI surveillance network in southeast France from 1995 to 2003. Data were analysed from 187 surgical wards that had participated in the network for at least two years. The change in SSI rate over time was modelled using a hierarchical logistic regression model with patients clustered within surgical wards. Of the 200 207 patients selected, 3786 (1.9%) had an SSI. The nine-year trend in SSI rate estimated by an odds ratio of 0.95 (95% confidence interval 0.93–0.97) was interpreted as a 5% decrease in SSI rate per year. This decrease was constant over the study period and was observed for almost all of the different types of surgical operations (orthopaedic, gastrointestinal, urology, etc). Overall SSI rates were reduced by 45% over a period of nine years. This trend was maintained even when taking into account the heterogeneity of the surgical wards and the diversity of patient demographics over time. From this, the 5% decrease per year can be reasonably interpreted as a result of preventive measures taken by surgical wards to reduce SSIs.

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Introduction

Surgical site infection (SSI) is the third most common hospital-acquired infection (HAI) and is associated with important outcomes in terms of morbidity, mortality and hospital costs.[1] In France the SSI incidence rates have been reported as 0.2—10.2% depending on the surgical procedure in the national SSI surveillance network (2003); similar rates have been reported from other European and non-European countries.[2—6] Surveillance is considered as essential for the prevention of HAI and especially for SSIs. Feeding back the results to surgeons and surgery staff provides the opportunity to describe incidence rates and trends and to discuss related determinants.[7]

Surveillance can be done within a single surgical ward, enabling it to monitor its own rates over time; however, networking with common surveillance methodology is recommended in order to allow comparison and benchmarking between different wards or hospitals.[8—17]

Using data from the surveillance network to model temporal trends in SSI rates can provide biased results since changes in rates could be related either to the increased number of wards or to a progressive selection of characteristics of the wards participating in the network. These biased results could be explained by differences between surgical wards but also by differences between patient characteristics within surgical wards.[18] To obtain unbiased temporal trends, the influence of surgical wards and the patient-related risk factors have to be taken into account using appropriate statistical analyses that consider the patients clustered in the ward where the surgery is performed.[19—22] The patient level provides measures of patient-related risk factors for developing an SSI at the time of the operation, whereas the ward level gives proxy measures of the surgical ward's resources and normative environment that might explain variations in SSI rate.

A surveillance network has existed for 15 years in the southeast of France and the data collected can be used to describe regional temporal trends in SSI rates and evaluate the control programmes conducted by the healthcare providers in the region.[23] The aim of this study was to estimate the temporal trends in SSI incidence by taking into account the patient-related risk factors and the influence of surgical wards in this large SSI surveillance network from 1995 to 2003.

Methods

Study population

The study population comprised patients undergoing surgery, including outpatient surgery, in surgical wards contributing to the southeast CCLIN network (http://cclin-sudest.chu-lyon.fr/reseaux/iso/).[24] This network was created in October 1993 and provides surveillance tools for data collection from surgical wards of public and private healthcare centres participating on a voluntary basis. Data are collected for at least four months per year (January to April or September to December) and each enrolled patient is followed up for at least 30 days after the surgical procedure or for at least one year if a prosthesis has been implanted. For this analysis, only wards that had participated for at least two years out of the nine-year study period were included.

Definitions of SSIs are those of the National Nosocomial Infection Surveillance System (NNIS).[25] Surgical intervention is defined as the performance of one or more surgical procedures, classified according to the French catalogue of medical procedures, performed on a patient during a single visit in the operating room. If several procedures were performed during one single operation, only the main procedure was taken into account.

Reinterventions within 30 days at the same site were excluded from surveillance, whatever the reason for the operation (infectious or non-infectious complications). The other excluded procedures were: interventional radiological procedures or surgical procedures for diagnostic purposes (except exploratory laparotomy); insertion of vascular routes (implant sites, central venous routes and fistulae) and pacemakers; certain procedures on skin and soft tissues (i.e. episiotomy, circumcision, skin biopsy and simple incisions of superficial skin abcesses); vaginal birth and in-vitro fertilisation.

Studied covariables

A time variable was built to describe the year each surgical ward participated. Two other types of variables were considered; those concerning the patient (age and gender) and those concerning the surgery (emergency surgical procedure, multiple procedure, implant/prosthesis, laparoscopy or video-assisted surgery and type of procedure grouped in 10 different operative categories).