Surgical Site Infections in HIV-infected Patients: Results from an Italian Prospective Multicenter Observational Study


Abstract

Background: The quality of life of the HIV-infected population in developed countries has substantially improved over the years. Accordingly, the clinical limitations in the surgical treatment of the HIV-infected patients are becoming fewer, and the number of HIV-infected patients undergoing surgical interventions of all types is increasing. However, available data on the incidence and risk factors for post-surgical complications, such as surgical site infections (SSI), in HIV-infected patients are still limited and often controversial. The aim of this study was to determine the incidence and the associated risk factors for SSI in HIV-infected patients.

Methods: A 1-year observational prospective multicenter surveillance study was conducted in 11 Italian Infectious Diseases Clinical Centers from which 305 consecutive HIV-infected patients undergoing different surgical procedures were enrolled. Postdischarge surveillance was conducted within 30 days after surgery. A number of variables were included in a multivariate analysis aimed at assessing potential risk factors for SSI, including body mass index, diabetes, Hepatitis C (HCV) and hepatitis B virus infection, lipodystrophy, HIV viral load, CD4 cell count and white blood cell count, preoperative hospital stay, National Nosocomial Infection Surveillance (NNIS) risk score, and any antimicrobial prophylaxis.

Results: SSI occurred in 29 of 305 (9.5%) patients, of which 17 (58.6%) SSI occurred during hospital stay, and 12 (41.4%) occurred during the postdischarge period. The SSI of the 29 patients were classified as superficial (21, 72.4%), deep (four, 13.8%), organ/space (one, 3.4%), and sepsis (three, 10.3%). Nearly 50% of the superficial and 50% of the deep SSI occurred during the postdischarge period. Organ/space infection and sepsis accounted for 13.7% of all SSI and were observed during the in-hospital stay. The multivariate analysis revealed that HCV co-infection was significantly associated to SSI occurrence. Total hospital stay was longer among patients with SSI than among those without SSI (p = 0.041).

Conclusion: Although 92.5% of our HIV-infected patients presented a NNIS score ≤ 1, the SSI rate was twofold higher than that reported in Italian and European studies for the general population, with more severe clinical presentations. This is the first report of an association between HCV–HIV co-infection and SSI occurrence. Additionally, the viro-immunological status of our patients was not related to SSI occurrence, which suggests the need for further research for other potential risk factors that may be implicated in the occurrence of SSI.
Introduction
The quality of life and survival expectancy of HIV-infected patients have substantially improved [1, 2], and the clinical barriers towards surgical treatment of HIV-infected patients, which were once associated with poor surgical outcomes and to the surgeon’s concern about accidental exposure with the HIV, are gradually disappearing [3]. Indeed, the number of HIV-infected patients undergoing “high-risk” surgical interventions, such as orthotopic liver transplantation (OLT), is increasing [4–6], although these patients do have a higher risk of mortality from infectious complications [6]. However, the body of literature currently available on the incidence and risk factors for surgical site infection (SSI) in HIV-infected patients is limited and controversial, and it remains to be established whether HIV-infected patients should be considered at higher risk for SSI occurrence. In addition, only few Italian studies have been conducted on SSI in HIV-infected patients [7]. Given this background, we conducted a prospective observational multicenter study on SSI in HIV-infected patients who were followed-up in Infectious Diseases Hospitals. The aim of our study was to determine the incidence of SSI and the associated risk factors in HIV-infected patients.

Methods
This was an observational prospective multicenter surveillance study conducted in 11 Italian Infectious Diseases Clinical Centers between December 2005 and December 2006 which enrolled 305 HIV-infected patients undergoing the following surgical procedures: caesarean sections, gastrointestinal, biliary, and hepatosplenic interventions, cervico-facial district, plastic, and dermatological interventions, cardiovascular interventions, lymphadenectomies, and orthopedic, genitourinary tract, and thoracic interventions.

A coordinating physician was assigned to each participating center to collect and manage the patient-specific demographic, clinical, and operation-specific data, including the Karnofsky Index [8], and the data on SSI occurrence, including sepsis related to SSI. The HIV-infected patients also submitted to postdischarge surveillance for the first 30 days following the operative procedure to enable the detection of SSI occurring after discharge.

SSI diagnosis was performed using the Centers for Diseases Control and Prevention (CDC) standardized criteria [9]. Sepsis was defined according to the 2001 SCCM/ESICM/ACCP/ATS/SIS International Sepsis Definitions Conference [10]. In addition, the National Nosocomial Infection Surveillance (NNIS) risk index score was calculated according to CDC definition [11].

To assess potential risk factors for SSI, we first conducted a univariate analysis that included the following variables: gender, age, body mass index (BMI), diabetes, hepatitis C virus (HCV) infection, hepatitis B virus (HBV) infection, presence of lipo-dystrophy, HIV viral load, CD4 cell count and WBC at intervention time, preoperative hospital stay, which was stratified according to the median value for overall interventions, NNIS risk index score, and any preoperative antimicrobial prophylaxis. The HIV viral load and total hospital stay were categorized according to the median values of each variable. Univariate analysis was performed using the $\chi^2$ test, and the results were considered to be significant at $p < 0.05$.

Multivariate analysis was conducted using a backward stepwise elimination procedure, and the results were expressed in terms of odds ratio (OR) with their respective 95% confidence interval (CI).

Each participating institution received ethical approval from its respective Ethical Committee according to local regulations.

Results
Table 1 summarizes the main characteristics of the HIV-infected population enrolled in the study. SSI occurred in 29 of 305 (9.5%) patients; of these, 17 (58.6%) SSI occurred during hospital stay, and 12 (41.4%) occurred within 30 days after discharge.

Table 2 reports the classification of the 29 SSI according to the CDC’s criteria and stratified both for in-hospital and postdischarge occurrence. Most of the SSI (72.4%)