



Original research

## Postoperative infection risk after splenectomy: A prospective cohort study



Galinos Barmparas, Alexander W. Lamb, Debora Lee, Brandon Nguyen, Jamie Eng, Matthew B. Bloom, Eric J. Ley\*

Department of Surgery, Division of Acute Care Surgery and Surgical Critical Care, Cedars-Sinai Medical Center, Los Angeles, CA, USA

### HIGHLIGHTS

- The life-long risk for overwhelming post-splenectomy infection is well described.
- Still the early postoperative infection risk following splenectomy is understudied.
- Our study shows that splenectomy increases this early infection risk nearly 3-fold.
- Splenectomy also increased risk for intra-abdominal abscess by more than 4-fold.

### ARTICLE INFO

#### Article history:

Received 3 January 2015

Received in revised form

17 February 2015

Accepted 3 March 2015

Available online 14 March 2015

#### Keywords:

Splenectomy

Sepsis

Infectious complications

Abscess

Drains

Trauma

### ABSTRACT

**Introduction:** Splenectomy is associated with a life-long risk for overwhelming infections. The risk for early post-operative infectious complications following traumatic and elective splenectomy is, however, understudied. This investigation aimed to determine if splenectomy increases the risk for post-operative infections.

**Methods:** This was a retrospective review of prospectively collected data on patients admitted to the surgical intensive care unit (SICU) between 1/2011 and 7/2013 investigating the risk for infectious complications in patients undergoing a splenectomy compared with those undergoing any other abdominal surgery.

**Results:** During the 30-month study period, a total of 1884 patients were admitted to the SICU. Of those, 33 (2%) had a splenectomy and 493 (26%) had an abdominal surgery. The two groups were well balanced for age, APACHE IV score >20, and past medical history, including diabetes mellitus, cardiac history, renal failure or immunosuppression. Patients undergoing splenectomy were more likely to have sustained a traumatic injury (30% vs. 7%,  $p < 0.01$ ). After adjustment, splenectomy was associated with increased risk for infectious complications (49% vs. 29%, Adjusted Odds Ratio (AOR) [95% CI]: 2.7 [1.3, 5.6],  $p = 0.01$ ), including intra-abdominal abscess (9% vs. 3%, AOR [95% CI]: 4.3 [1.1, 16.2],  $p = 0.03$ ). On a subgroup analysis, there were no differences between traumatic and elective splenectomy with regards to overall infectious complications (50% vs. 46%,  $p = 0.84$ ), although, abdominal abscess developed only in those who had an elective splenectomy (0% vs. 12%,  $p = 0.55$ ).

**Conclusion:** Splenectomy increases the risk for post-operative infectious complications. Further studies identifying strategies to decrease the associated morbidity are necessary.

© 2015 IJS Publishing Group Limited. Published by Elsevier Ltd. All rights reserved.

## 1. Introduction

The vital role of the spleen in the regulation of the immune

system was recognized in the early 1900's [1], but it was not until the early 1950's after septic complications and deaths were observed in children from infections due to encapsulated bacteria that its importance in the clinical setting was established [2]. The overwhelming post-splenectomy infection (OPSI) is now a well described entity. The risk for OPSI is 0.04 per 100 person years exposure following routine splenectomy and 0.03 per 100 person years following splenectomy for trauma [3]. The vast majority of

\* Corresponding author. Cedars-Sinai Medical Center, Department of Surgery, 8700 Beverly Blvd, Suite 8215N, Los Angeles, CA 90048, USA.

E-mail address: [Eric.Ley@cshs.org](mailto:Eric.Ley@cshs.org) (E.J. Ley).

**Table 1**

Comparison of demographics and clinical data between splenectomy and no splenectomy in patients who required abdominal surgery.

	Total (n = 526)	Splenectomy (n = 33)	No splenectomy (n = 493)	p value
Age > 65 (y)	50.0% (263/526)	48.5% (16/33)	50.1% (247/493)	0.857
Male	54.0% (284/526)	60.6% (20/33)	53.5% (264/493)	0.431
BMI > 30	25.5% (134/525)	36.4% (12/33)	24.8% (122/492)	0.140
APACHE IV > 20 <sup>a</sup>	50.9% (110/216)	50.0% (7/14)	51.0% (103/202)	0.943
Trauma	8.4% (44/526)	30.3% (10/33)	6.9% (34/493)	<0.001
Mechanical ventilation	46.0% (242/526)	54.5% (18/33)	45.4% (224/493)	0.309
Vasopressors	21.3% (112/526)	27.3% (9/33)	20.9% (103/493)	0.386
Past medical history				
Cancer	51.0% (268/526)	48.5% (16/33)	51.1% (252/493)	0.770
Immunosuppression	10.5% (55/526)	18.2% (6/33)	9.9% (49/493)	0.141
Diabetes mellitus	24.1% (127/526)	30.3% (10/33)	23.7% (117/493)	0.393
CVA	4.6% (24/526)	3.0% (1/33)	4.7% (23/493)	1.000
COPD	6.8% (36/526)	6.1% (2/33)	6.9% (34/493)	1.000
Renal failure	7.6% (40/526)	12.1% (4/33)	7.3% (36/493)	0.303
Liver failure	3.2% (17/526)	0.0% (0/33)	3.4% (17/493)	0.616
Cardiac history	31.7% (167/526)	24.2% (8/33)	32.3% (159/493)	0.339
Surgical interventions				
Bowel resection	54.9% (289/526)	36.4% (12/33)	56.2% (277/493)	0.027
Hepatobiliary surgery	18.1% (95/526)	27.3% (9/33)	17.4% (86/493)	0.155

p values were extracted from Chi-Square or Fisher exact test for categorical variables.

SD, Standard Deviation; BMI, Body Mass Index; APACHE, Acute Physiology and Chronic Health Evaluation; CVA, Cerebrovascular Accident; COPD, Chronic Obstructive Pulmonary Disease.

<sup>a</sup> Of the total 526 patients, only a subset of 216 patients had available APACHE IV score.

OPSI occur more than 2 years following the procedure.

The risk for early postoperative infectious complications following splenectomy remains understudied. Several reports from the trauma and non-trauma literature attempt to highlight this risk, but the results are conflicting [4–10]. Furthermore, in trauma patients, associated injuries and required resuscitation during the procedure introduce bias regarding infections. Nonetheless, understanding the early infection risk after splenectomy is of paramount clinical applicability as it can reduce the morbidity associated with post splenectomy infectious complications.

The purpose of this study was to characterize the risk of early postoperative infectious complications following splenectomy, including ventilatory associated pneumonia (VAP), urinary tract infection (UTI), wound infection, bacteremia, catheter-related blood stream infection (CRBSI) and intra-abdominal abscess. We hypothesized that splenectomy increases the risk for these early postoperative infectious complications.

## 2. Methods

This was a retrospective review of a prospectively maintained database of patients admitted to the 24-bed surgical ICU at the Cedars-Sinai Medical Center over a 30-month period ending in July 2013. We compared patients undergoing a splenectomy to those undergoing any other abdominal procedure excluding liver, kidney or pancreatic transplantation. Demographics and relevant clinical data, including age, gender, body mass index (BMI), admission Acute Physiology and Chronic Health Evaluation (APACHE) IV score and past medical history were collected. Splenectomy patients were compared to those undergoing any other abdominal procedure. The primary outcome was infectious complications, including ventilatory associated pneumonia (VAP), urinary tract infection (UTI), wound infection, bacteremia, catheter-related blood stream infection (CRBSI) and intra-abdominal abscess. Cultures were conducted at the discretion of the rounding SICU team and infections were defined as positive cultures of their respective sources.

Continuous variables are described as means with standard deviations (SDs) and categorical variables as percentages. For the purposes of the comparison between splenectomy and no-

splenectomy patients, standard statistical tools were utilized, including chi-square or Fisher exact test for dichotomous variables, and Student t test or Mann–Whitney U test for continuous variables. To calculate the adjusted overall risk for development of infectious complications, all variables that were significantly different between the 2 groups at a  $p < 0.050$  level were entered in a multivariable regression logistic model.

The conduction of this study was approved by the institutional review board and work was fully compliant with the STROBE Statement [11]. All statistical analyses were performed using the IBM SPSS Statistics for Windows, Version 20.0 (Armonk, NY: IBM Corp.).

## 3. Results

During the 30-month study period, a total of 1884 patients were admitted to the surgical ICU. Of those, 33 (1.8%) had a splenectomy and 493 (26.2%) had an abdominal surgery, excluding an organ transplantation. For the 526 included patients, the mean age  $\pm$ SD was  $60.9 \pm 32.6$  years, with 54.0% being male and 50.9% having an APACHE IV score  $>20$  (Table 1). The indications for splenectomy included trauma (10/33 or 30.3%), pancreatic tumor (10/33 or 30.3%), hematologic disease (4/33 or 12.1%), iatrogenic injury (3/33 or 9.1%) and other (6/33 or 18.2%). When abdominal surgeries that required splenectomy were compared to those that did not, an increased rate of traumatic injury occurred in splenectomy patients (30.3% vs. 6.9%,  $p < 0.001$ ), while male gender, obesity, APACHE score  $>20$ , mechanical ventilation and vasopressors had similar rates (Table 1). Bowel resection was less common with splenectomy compared to no-splenectomy (36.4% vs. 56.4%,  $p = 0.027$ ).

After adjusting for trauma and bowel resection, splenectomy patients were at a significantly higher risk for development of overall infectious complications (48.5% vs. 28.6%, adjusted odds ratio: 2.67; 95% Confidence Interval: 1.28, 5.59; adjusted  $p = 0.009$ ). When infections were divided into type, the adjusted risk was similar between splenectomy and no splenectomy patients for VAP, UTI, bacteremia, CRBSI and wound infection but it was significantly higher for the development of an intra-abdominal abscess (9.1% vs. 3.0%, adjusted odds ratio: 4.29; 95% Confidence Interval: 1.14, 16.16; adjusted  $p = 0.031$ ) (Table 2).

Download English Version:

<https://daneshyari.com/en/article/4286018>

Download Persian Version:

<https://daneshyari.com/article/4286018>

[Daneshyari.com](https://daneshyari.com)