

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.JournalofSurgicalResearch.com

Association for Academic Surgery

Splenic embolization after trauma: an opportunity to improve best immunization practices



Kyle G. Crooker, MHSA, BA, James M. Howard, MD,
Aaron R. Alvarado, BA, Tracy J. McDonald, RN, MSN,
Stephany D. Berry, MD, Justin L. Green, MD, MBA, PhD,
and Robert D. Winfield, MD*

Trauma/Critical Care Division, University of Kansas Medical Center, Kansas City, Kansas

ARTICLE INFO

Article history:

Received 5 March 2018
Received in revised form
2 June 2018
Accepted 12 June 2018
Available online xxx

Keywords:

Trauma
Spleen
Blunt abdominal injury
Vaccination
Immunity

ABSTRACT

Background: The spleen is the second most commonly injured solid organ during blunt abdominal trauma. Although total splenectomy is frequently performed for injury, splenic rupture can also be managed by splenic embolization. For these patients, current Advisory Committee on Immunization Practices (ACIP) recommendations indicate that if 50% or more of the splenic mass is lost, patients should be treated as though they are asplenic. We have previously demonstrated that compliance with ACIP guidelines regarding immunization after splenectomy is poor. Compliance with vaccination in the setting of splenic embolization for trauma is unknown and we hypothesized patients would not receive the recommended immunizations.

Materials and methods: All admissions at our level 1 trauma center requiring splenic embolization secondary to traumatic injury between January 1, 2010, and November 1, 2015, were reviewed. Demographic and injury data, dates and imaging of splenic embolizations, immunization documentation, subsequent vaccination boosters received, and outcomes were collected from the medical record. The proportion of spleen embolized was estimated by review of angiographic imaging using an established method.

Results: Nine thousand nine hundred sixty-five trauma patients were admitted during the period studied. Nineteen patients met inclusion and exclusion criteria. Median age of the patient population was 35 y, 85% were male, and median injury severity score was 28. Of these, 15 patients underwent a splenic embolization, in which 50% or more of their splenic mass was lost through embolization. Eight patients received at least one immunization before discharge. Six received initial immunizations against *Streptococcus pneumoniae*, *Neisseria meningitidis*, and *Haemophilus influenzae*, while three received only the initial immunization against *S pneumoniae*. None of the 15 patients received any ACIP-recommended booster. Of the four patients having less than 50% of their spleen embolized, three wrongly received immunization against encapsulated organisms before hospital discharge.

Source of financial support: No outside support.

These data were presented at the 13th Annual Academic Surgical Congress, Jacksonville, Florida, Thursday, February 1st.

* Corresponding author. Department of Surgery, University of Kansas Medical Center, 3901 Rainbow Boulevard, Mail Stop 2005, Kansas City, KS 66160. Tel.: +1 913 945 6590; fax: +1 913 588 7540.

E-mail address: rwinfield@kumc.edu (R.D. Winfield).

0022-4804/\$ – see front matter © 2018 Elsevier Inc. All rights reserved.

<https://doi.org/10.1016/j.jss.2018.06.036>

Conclusions: Trauma patients undergoing splenic embolization at our institution receive postsplenectomy immunizations incorrectly and had no recorded booster vaccines. We speculate that this is common among the U.S. trauma centers. Review of immunization practices in our trauma and nontrauma patient populations is underway in our health system to improve the care of these patients, and our experience may serve as a guide for other centers to reduce complications associated with asplenia.

© 2018 Elsevier Inc. All rights reserved.

Introduction

The spleen is the second most commonly injured solid organ during abdominal blunt trauma.^{1–3} There are various therapeutic options for splenic injury due to blunt trauma. In the early 1900s, observation and expectant management was the therapeutic paradigm but this changed to predominately operative management.⁴ Currently, blunt splenic injury is managed through selective operative and nonoperative management that depends on a patient's hemodynamic stability and accompanying injuries to other organs.^{1,4} Operative management through splenectomy remains the gold standard for treating hemodynamically unstable patients with blunt splenic injury¹; however, there has been a shift toward managing the hemodynamically stable patients with nonoperative management and splenic arterial embolization (SAE).^{1,5} Although there is significant practice variation among level 1 trauma centers with regards to the use of SAE, centers with the higher rates of SAE use have higher spleen salvage and less nonoperative management failure.⁶

This shift toward nonoperative management and SAE is due, in part, to the increased susceptibility of patients to infections after splenectomy, especially fatal sepsis.⁵ As the spleen is the largest accumulation of lymphoid tissue in the body, patients undergoing splenectomy carry an increased risk of overwhelming postsplenectomy infection (OPSI), which carries a high mortality rate.⁷ While the risks associated with asplenia are widely known, if less than 50% of the spleen is considered intact, patients should be considered functionally asplenic and, therefore, potentially susceptible to OPSI.⁸ Although OPSI can occur with any organism, including bacteria, virus, fungus, or protozoan, functionally asplenic patients are at increased risk of infection from encapsulated organisms.⁷ Of these encapsulated organisms, *Streptococcus pneumoniae* accounts for greater than 50% of patients with OPSI while *Haemophilus influenzae* type B is the second most common cause followed by *Neisseria meningitidis*.⁹ To protect against infection in these patients, the Advisory Committee on Immunization Practices (ACIP) recommends both types of pneumococcal vaccine including the 13-valent pneumococcal conjugate vaccine (Pneumovax 13 [PCV13]) and the 23-valent pneumococcal polysaccharide vaccine (Pneumovax 23 [PPSV23]).^{10,11} The dose of Pneumovax 13 should be given first, followed by the Pneumovax 23 at least 8 wk later with a follow-up booster of Pneumovax 23 5 y after the first dose.¹⁰ Moreover, ACIP also recommends patients to receive the *H influenzae* type B conjugate vaccine and the quadrivalent conjugate meningococcal vaccine (serotypes A, C, W-135, and Y) followed by a meningococcal booster.^{10,11} As the vaccinations cannot be taken prophylactically in trauma patients, ACIP recommends that the first dose of the

forementioned immunizations is administered before the patient's discharge from the hospital.^{10–12}

We previously demonstrated poor compliance with the immunizations and follow-up boosters recommended post-splenectomy due to trauma at our level 1 trauma center and the subsequent finding that 22.5% of patients returned with an infection or sepsis.¹¹ As patients undergoing splenectomy only represent a portion of patients with splenic trauma, patients undergoing splenic artery embolization secondary to trauma can be included in the overall immunization compliance picture for those patients with less than 50% of the spleen considered intact.⁸ We hypothesized that patients undergoing SAE due to blunt trauma would have poor compliance with ACIP immunization guidelines.

Methods

All trauma admissions to the level 1 trauma center at the University of Kansas Hospital between January 1, 2010, and November 1, 2015, were reviewed. Within the reviewed population, we included all patients undergoing SAE secondary to trauma. We excluded patients who were younger than 18 y of age, older than 89 y of age, had a current pregnancy, had an immunosuppressive status (malignancy or other known immune suppressive state), and were current prisoners. For all patients, we obtained demographic information, injury data, Injury Severity Scale scores, dates of SAEs, percent of spleen embolized, whether immunization was warranted, immunization documentation, subsequent vaccination boosters received, date of subsequent booster, patient outcomes after discharge, subsequent readmission for infection or sepsis, the infectious diagnosis on readmission, any species isolated during readmission, and the outcome of the admission for infection or sepsis. The percentage of spleen embolized was estimated using images obtained during angiographic embolization using the method described by Ou *et al.*¹³

The study was approved with a waiver of informed consent by the Human Subjects Committee of the University of Kansas Medical Center in Kansas City.

Results

Nine thousand nine hundred sixty-five level 1 trauma patients were admitted during the period studied. Of these, 20 patients underwent splenic artery embolization, with 19 patients meeting inclusion and exclusion criteria. One patient was excluded because they were determined to be in an immunosuppressed state separate from their SAE secondary to

Download English Version:

<https://daneshyari.com/en/article/8835224>

Download Persian Version:

<https://daneshyari.com/article/8835224>

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