Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.JournalofSurgicalResearch.com

Association for Academic Surgery

Predictors of appendiceal perforation in an equal access system

Avery Walker, MD,[a] *Quinton Hatch, MD,*[a] *Thurston Drake, MD,*[b] *Daniel W. Nelson, DO,*[a] *Emilie Fitzpatrick, MD,*[a] *Jason Bingham, MD,*[a] *George Black, MD,*[a] *Justin A. Maykel, MD,*[c] *and Scott R. Steele, MD*[a,*]

[a] *Department of Surgery, Madigan Army Medical Center, Fort Lewis, Washington*
[b] *Department of Surgery, University of Washington, Seattle, Washington*
[c] *Division of Colorectal Surgery, University of Massachusetts Memorial Medical Center, Worcester, MA*

ARTICLE INFO

Article history:
Received 24 December 2013
Received in revised form
17 February 2014
Accepted 19 February 2014
Available online 22 February 2014

Keywords:
Appendicitis
Appendectomy
Rank
Race
Socioeconomic status

ABSTRACT

Background: Discrepancies in socioeconomic factors have been associated with higher rates of perforated appendicitis. As an equal-access health care system theoretically removes these barriers, we aimed to determine if remaining differences in demographics, education, and pay result in disparate outcomes in the rate of perforated appendicitis.

Materials and methods: All patients undergoing appendectomy for acute appendicitis (November 2004–October 2009) at a tertiary care equal access institution were categorized by demographics and perioperative data. Rank of the sponsor was used as a surrogate for economic status. A multivariate logistic regression model was performed to determine patient and clinical characteristics associated with perforated appendicitis.

Results: A total of 680 patients (mean age 30 ± 16 y; 37% female) were included. The majority were Caucasian (56.4% [$n = 384$]; African Americans 5.6% [$n = 38$]; Asians 1.9% [$n = 13$]; and other 48.9% [$n = 245$]) and enlisted (87.2%). Overall, 6.4% presented with perforation, with rates of 6.6%, 5.8%, and 6.7% ($P = 0.96$) for officers, enlisted soldiers, and contractors, respectively. There was no difference in perforation when stratified by junior or senior status for either officers or enlisted (9.3% junior *versus* 4.40% senior officers, $P = 0.273$; 6.60% junior *versus* 5.50% senior enlisted, $P = 0.369$). On multivariate analysis, parameters such as leukocytosis and temperature, as well as race and rank were not associated with perforation ($P = 0.7$). Only age had a correlation, with individuals aged 66–75 y having higher perforation rates (odds ratio, 1.04; 95% confidence interval, 1.02–1.05; $P < 0.001$).

Conclusions: In an equal-access health care system, older age, not socioeconomic factors, correlated with increased appendiceal perforation rates.

Published by Elsevier Inc.

The results and opinions expressed in this article are those of the authors, and do not reflect the opinions or official policy of the United States Army or the Department of Defense.

This manuscript was presented at the 2014 Academic Surgical Congress; February 4–6, 2014; San Diego, California.

* *Corresponding author*. Department of Surgery, Madigan Army Medical Center, 9040-A Fitzsimmons Avenue, Tacoma, WA 98431.Tel.: +1 253 968 2200; fax: 253 968 5900.

E-mail address: averyw21@gmail.com (S.R. Steele).

0022-4804/$ – see front matter Published by Elsevier Inc.
http://dx.doi.org/10.1016/j.jss.2014.02.028

1. Introduction

Worldwide, appendicitis is the most common indication for an urgent intra-abdominal operation [1]. The traditional pathophysiological model of appendicitis implicates a progressive process that typically proceeds from luminal obstruction to intramural venous congestion and ultimately ischemic compromise leading to necrosis and perforation [2]. This model has been the driving force behind efforts to take patients diagnosed with appendicitis expeditiously to the operating room. The misdiagnosis of appendicitis is costly in terms of patients' pain and suffering, as well as in the financial expense brought on to the hospital due extended treatments and care. With regards to perforation rates, it has been previously reported that waiting times for consultations in the emergency department are longer for those in lower socioeconomic brackets [3]. In the United States, those in the lower income ranges were found to have progressed to perforation more often than those in the high-income ranges. The authors concluded that this may be secondary to financial concerns such as an inability to pay and a lack of a stable primary care provider as reasons for the discrepancy within the United States [3]. This is in contrast to the Canadian health care system in which patients are entitled to equitable access to care based on medical need, regardless of socioeconomic status [3]. Another recent study by Cheong *et al.* compared perforated appendicitis rates among children in Canada and the United States to different insurance systems. Perforation rates were lower in Canadian patients than in publicly insured or noninsured U.S. patients in all children aged <17 y. The authors attribute this to the possibility of greater access of the youngest children to tertiary pediatric care [4]. The same group found similar results when looking at a unique population within Canada. Native Canadians had much high rates of perforation rates due to the need to travel large distances for care [5]. All this is to say that negative outcomes with appendicitis stem from access and the inability to pay. A system that removes these factors is one in which the military health care system, in theory, attempts to create to decrease the negative outcomes of appendicitis.

Other causes for discrepancies in outcomes are far more likely to be multifactorial and include physician variability in practice, patient beliefs of their disease process, socioeconomic status, and access to care. Each of these aspects makes the military health system (MHS), especially regarding the United States, a unique setting to study outcomes. Within the MHS, beneficiaries are an ethnically diverse population and encompass people from all socioeconomic backgrounds. Another unique characteristic to the military health care system is that once within the system, the concept of universal care is well established. Soldiers and their dependants alike understand that they are entitled to equitable access to care based on medical need, regardless of socioeconomic status, similar to the access of many Canadians. However, within the military system, there is also a pre-existing rank structure that is based not solely on merit but also, in part, on education and experience. Within these ranks, pay grades vary as well, with higher ranks typically bringing in a higher income. To add, race and ethnicity vary, creating an equal-access health care system microcosm of the United States that spans several classical sources of varying outcomes.

Within this context, our primary objective of this study was to assess whether there are associations between race/ethnicity and socioeconomic status in the frequency of perforated appendicitis among subpopulations of patients treated within a universal access health care system.

2. Materials and methods

This study was performed at a military tertiary care referral center and was approved by the local Institutional Review Board. The Military Health System or MHS provides health care to active duty and retired U.S. military personnel and their dependents. Its primary mission is to provide health support for the full range of military operations and sustain the health of all 9.6 million beneficiaries assigned to it. TRICARE is a component of the MHS that provides civilian health care for all beneficiaries not involved in contingency or combat operations [6]. The MHS comprises of 65 hospitals and 412 outpatient clinics, in addition to contingency and combat-theater operations worldwide—all with an operating budget of $46 billion [6–9]. This is in contrast with the Veterans Administration health system, which cares for primarily military veterans and rarely some dependents, based off of a system of eight priority groups where grouping is determined by a percentage of service-connected disabilities or illness at time of separation. In the MHS, the use of the military's electronic medical record, Armed Forces Health Longitudinal Technology Application, assists with electronic reminders for providers' patient encounters. In addition, there is use of the Military Health System Population Health Portal, a secure web-based tool that is used by the Army Medical Department that assists in population health and system improvement.

We used a keyword search of all records within our electronic health record from November 2004 to November 2010 to identify patients with a postoperative diagnosis of appendicitis. Individual operative and pathology reports were then evaluated to confirm the presence or absence of perforation. All interval and incidental appendectomies performed for any reason other than for the presumed diagnosis of acute appendicitis were excluded. Demographic data and diagnostic workup was collected using the inpatient records system (Essentris) and the military outpatient records system (Armed Forces Health Longitudinal Technology Application). Demographics included factors such as age, race, and gender. Per the electronic health record system, "other" or no race at all, is an option that patients may choose. In addition, clinical parameters such as laboratory and radiological data were included; specifically, admission temperature, white blood cell (WBC) count, neutrophil percentage, and computed tomographic (CT) results were recorded. The Alvarado score was also included in this analysis, which uses the following criteria to obtain a score that has been validated in multiple studies: migration to the right iliac fossa, anorexia, nausea or vomiting, tenderness in the right iliac fossa, rebound pain, elevated body temperature, leukocytosis, and shift of

Download English Version:

https://daneshyari.com/en/article/4300165

Download Persian Version:

https://daneshyari.com/article/4300165

Daneshyari.com