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Incision & drainage of perianal sepsis in the immunocompromised: A need for heightened postoperative awareness

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ABSTRACT

Background: Incision and drainage of perianal sepsis has appreciable success in the immunocompetent population, but outcomes after incision and drainage in the immunosuppressed population are unknown.

Methods: 13,666 patients (n = 930 immunosuppressed) undergoing incision and drainage of perianal sepsis between 2011 and 2015 in the American College of Surgeons National Surgical Quality Improvement Program were identified. The main outcomes were major morbidity, return to the operating room, and mortality. Multivariable analysis was performed for each outcome.

Results: Sepsis was the most common postoperative complication. Preoperative immunosuppression was an independent risk factor for major morbidity (odds ratio [OR]: 1.6, $p < 0.01$), return to the operating room (OR: 1.9, $p < 0.01$), and mortality (OR: 2.6, $p < 0.01$).

Conclusions: Immunosuppression is an independent risk factor for major morbidity, return to the operating room, and mortality. With post-operative sepsis the most common complication, inpatient admission and extended duration antibiotic therapy is warranted in immunosuppressed patients.

Introduction

Perianal and anorectal abscesses, herein termed perianal sepsis, and their sequelae including fistula development are a common anorectal pathology affecting over 100,000 people in the United States annually.[1] The infection typically arises from clogged anal crypt or anal skin glands which results in pus subsequently tracking into the subcutaneous perianal space and ischiorectal fat.

Incision and drainage (I & D) is the established treatment for perianal sepsis[2] resulting in high rates of resolution and minimal morbidity and mortality in immunocompetent patients.[3,4] However, outcomes after I and D are less well described in immunocompromised patients. The majority of published literature focuses on patients with cancer[5,6] or human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS).[7,8] In the current era of improved survival of transplant recipients[9–12] and an increasing prevalence of autoimmune disorders,[13,14] there is a growing population of patients on chronic immunosuppression regimens; subsequently, there is a need for data on postoperative outcomes after I and D of perianal sepsis in this population of patients who are susceptible to developing overwhelming infections.

Therefore, we utilized a large multi-center database to determine 1) the leading complications that immunocompromised patients suffer in the postoperative period and 2) the impact preoperative immunosuppression has on morbidity and mortality following I & D of perianal sepsis in order to determine whether any modifications can be made to the postoperative management of these patients.

Materials and methods

Data source

The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) participant user files (PUFs)

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from 2011 to 2016 were used. At each participating hospital, trained clinical reviewers abstract data per ACS-NSQIP protocol on a large number of variables. Random audits are routinely performed to ensure the quality and the accuracy of the data. As the data are de-identified, it is exempt from review by the institutional review board at our institution.

Definition of immunosuppression

Immunosuppression was defined by the ACS-NSQIP "steroid" variable which states, "Patient has required the *regular administration of oral or parenteral corticosteroid* (e.g. Prednisone, Decadron) *medications* or *immunosuppressant medications*, within the 30 days prior to the principal operative procedure or at the time the patient is being considered as a candidate for surgery, for a chronic medical condition …. A one-time pulse dose, limited short course therapy, or a taper of less than 10 days duration of corticosteroids would not qualify." This definition has been consistent, without alteration, *since 2011,* hence the choice of the 2011–2016 PUFs. All patients with an answer of "yes" for this variable were placed in the "immunosuppressed group" and patients with an answer of "no" were placed in the "immunocompetent group."

Operations and diagnoses

All patients undergoing I & D for perianal sepsis were identified by the following primary Current Procedural Terminology (CPT) codes: 45000, 45005, 45020, 46040, 46045, and 46060. Abscess location was defined by these CPT codes as detailed in Table 1. Patients with a diagnosis of Crohn's disease (ICD 9: 555.x or ICD 10: K50.x) were excluded due to the multimodal medical and surgical complexity in managing perianal sepsis in this population. Additionally, if a patient had a secondary CPT for debridement for necrotizing fasciitis or concurrent drainage of an abscess in another anatomic region, they were excluded. Fig. 1 details the patient selection. After identification of all patients with the primary CPT of interest, secondary and concurrent CPT codes were then searched for the presence of either CPTs 46270, 46275, or 46280 which indicated the additional procedure of fistulotomy or CPT 46020 which indicated the additional procedure of seton placement. This resulted in three groups: I & D alone, I & D with fistulotomy, or I and D with seton placement. The occurrence of CPT 46060 alone was included in the I & D plus fistulotomy group since the CPT code includes both I and D and performance of a fistulotomy.

Outcomes

The primary outcomes studied were 30-day major morbidity, 30-day mortality, and 30-day return to the operating room (ROR). Major morbidity was defined as any one of the following post-operative complications: deep incisional surgical site infection, wound disruption, organ space infection, pneumonia, unplanned intubation, ventilator requirement greater than 48 h, venous thromboembolism (deep venous thrombosis and pulmonary embolism), acute kidney injury (progressive renal insufficiency and acute renal failure), stroke, cardiac (cardiac arrest requiring cardiopulmonary resuscitation and myocardial infarction), post-operative blood transfusion, and postoperative sepsis and septic shock. Sepsis and septic shock are defined in ACS-NSQIP by their consensus definitions.[15,16] Secondary outcomes were independent risk factors for each of the listed primary outcomes.

Table 1
Perianal abscess location by CPT code.

CPT code	Abscess Location
45000	Pelvic abscess
45005	Submucosal abscess
45020	Deep supralevator, pelvirectal, or retorectal abscess
46040	Ischiorectal or perirectal abscess
46045	Intramural, intramuscular, or submucosal abscess
46060	Ischiorectal or intramural abscess

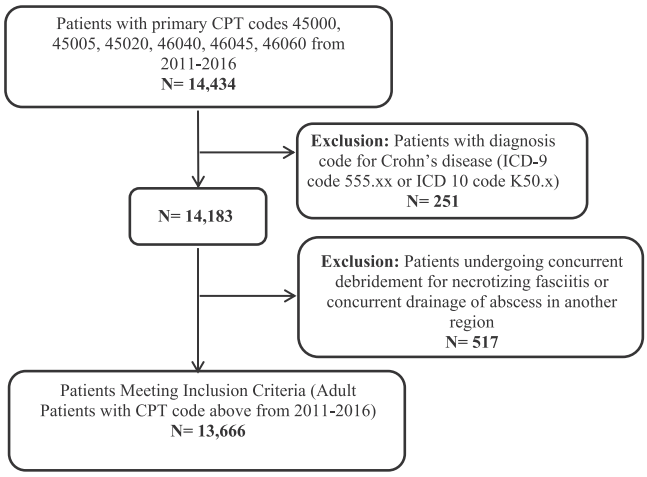

Fig. 1. Patient selection flow chart.

Variables

Patient variables included age, race/ethnicity, sex, body mass index (BMI), and outpatient immunosuppressant use. Comorbidities included diabetes treated with oral medications or insulin, history of severe chronic obstructive pulmonary disease (COPD), hypertension requiring medication, current tobacco use, and >10% body weight loss in the preceding 6 months. Labs included hematocrit, white blood cell count, platelet count, and albumin. Operative characteristics included the presence of pre-operative systemic inflammatory response syndrome (SIRS), preoperative systemic sepsis, and pre-operative septic shock, in addition to emergent case status, American Society of Anesthesiologists (ASA) score, the operation performed, and the abscess location.

Statistics

Continuous variables are presented as median and interquartile range and categorical variables are presented as the number and percent. Missing data was excluded from the univariate analysis and included as a "missing" category in multivariable analysis where needed. Univariate comparisons on the occurrence of major morbidity, ROR, and mortality were performed. Multivariable logistic regression models were then constructed for major morbidity, ROR, and mortality with consideration of all variables with a p value < 0.10 on univariate analysis individually for model entry. All analysis was done using SAS 9.4 software SAS 9.4 (SAS Institute, Cary, NC) and statistical significance was set at $p < 0.05$. Multivariable logistic regression was chosen to adjust for observed differences between the groups instead of matching due to demonstrated equivalence of the methods,[17] and potential superiority of logistic regression over matching when utilizing large datasets.[18]

Results

Demographics and operation characteristics

A total of 13,666 patients underwent I & D of perianal sepsis with 930 (7%) patients in the immunosuppressed group and 12,736 (93%) patients in the immunocompetent group. Immunosuppressed patients were more often female and were often from ASA class III or higher than immunocompetent patients. Approximately one-third of patients in each group presented with SIRS, sepsis, or in septic shock. Preoperative labs revealed that immunosuppressed patients were more often anemic (hematocrit < 30%) and more frequently had an albumin level below the reference range (<3.5 g/dL) than the immunocompetent patients.

Abscess location was similar between the groups with the majority being ischiorectal in nature. However, the operation performed differed between the groups with immunosuppressed patients more often undergoing fistulotomy and/or seton placement in addition to I & D than immunocompetent patients (Table 2).

Table 2
Demographics of immunosuppressed versus immunocompetent patients.

Variable	Immunocompetent (N = 12,736)	Immunosuppressed (N = 930)	*p* value
Age, median (interquartile range)	45 (34–56)	42 (32–56)	<0.01
Race/ethnicity			<0.01
Non-Hispanic White	7104 (56)	604 (65)	
Hispanic White	1108 (9)	37 (4)	
Black/African American	2271 (18)	168 (18)	
Asian	586 (5)	16 (2)	
American Indian	55 (<1)	3 (<1)	
Other	1612 (13)	102 (11)	
Female	3945 (31)	365 (39)	<0.01
Obese (BMI $\geq$ 30 kg/m^2)			<0.01
Yes	5520 (46)	260 (30)	
No	6552 (54)	630 (71)	
Missing	664	40	
>10% body weight loss prior 6 months	128 (1)	37 (4)	<0.01
Tobacco use	4236 (33)	253 (32)	0.57
Diabetes Mellitus			<0.01
Insulin	1033 (8)	71 (8)	
Oral medications	1201 (9)	56 (6)	
No	10502 (83)	803 (86)	
Hypertension	3711 (29)	268 (29)	0.84
COPD	293 (2)	47 (5)	<0.01
Transfusion > 4 units of blood in 72 h before surgery	97 (1)	23 (3)	<0.01
Systemic sepsis preoperatively			<0.01
SIRS	789 (6.2)	51 (5.5)	
Sepsis	3297 (25.9)	240 (25.8)	
Septic shock	64 (0.5)	13 (1.4)	
No	8586 (67.4)	626 (67.3)	
Hematocrit < 30%			<0.01
Yes	785 (7)	160 (19)	
No	9908 (93)	663 (81)	
Missing	2043	107	
WBC > 10.5 $\times$ 10^9/L			<0.01
Yes	6494 (61)	402 (49)	
No	4096 (39)	419 (51)	
Missing	2146	109	
Albumin <3.5 g/dL			<0.01
Yes	2269 (40)	291 (51)	
No	3394 (60)	279 (49)	
Missing	7073	360	
ASA Class			<0.01
I	1705 (13)	22 (2)	
II	6680 (53)	481 (52)	
III	3858 (30)	352 (38)	
IV	461 (4)	74 (8)	
V	2 (<1)	0	
Missing	30	1	
Emergency Case	4119 (32)	246 (27)	<0.01
Operation Performed			<0.01
I & D only	10280 (81)	679 (73)	
I & D plus Fistulotomy	2095 (16)	195 (21)	
I & D plus Seton Placement	361 (3)	56 (6)	
CPT code			<0.01
45000	132 (1)	9 (1)	
45005	499 (4)	27 (3)	
45020	369 (3)	30 (3)	
45040	9087 (71)	623 (67)	
45045	698 (6)	55 (6)	
46060	1951 (15)	186 (20)	

All data presented as number (%) unless otherwise noted; WBC – white blood cell count.

Table 3
Complications in immunocompetent versus immunosuppressed patients.

Complication, n (%)	Immunocompetent	Immunosuppressed	*p*-value
Mortality	62 (<1)	17 (2)	<0.01
Return to the operating room	561 (4)	77 (8)	<0.01
Sepsis	860 (7)	102 (11)	<0.01
Septic Shock	75 (1)	14 (2)	<0.01
Blood Transfusion	147 (1)	37 (4)	<0.01
Deep Incisional SSI	298 (2)	28 (3)	0.20
Organ Space SSI	115 (1)	14 (2)	0.07
Pneumonia	55 (<1)	13 (1)	<0.01
Unplanned Intubation	40 (<1)	6 (1)	0.13
Venous Thromboembolism	32 (<1)	7 (1)	0.02
Acute Kidney Injury	54 (<1)	6 (1)	0.30
Stroke	6 (<1)	0	1.0
Cardiac	24 (<1)	4 (<1)	0.12

Major morbidity, return to the operating room, and mortality

Following I & D, immunosuppressed patients suffered from one or more major complications more frequently than immunocompetent patients (19% vs 11%, $p < 0.01$). The difference was most noticeable with respect to the occurrence of postoperative sepsis (11% vs 7%, $p < 0.01$), and the rate of postoperative blood transfusion (4% vs 1%, $p < 0.01$). In addition, immunosuppressed patients required ROR at nearly double the rate of immunocompetent patients (8% vs 4%) and had over a threefold increased mortality rate (2% vs 0.5%). Specific complications were otherwise rare and similar between the two groups (Table 3).

Univariate and multivariable analysis

In addition to immunosuppressant use, pre-operative sepsis and septic shock, greater than 10% weight loss in the 6 months prior to surgery, and pre-operative blood transfusion were significant on univariate analysis for major morbidity, ROR, and mortality.

On multivariable analysis, immunosuppressant use remained a significant risk factor for each of the three primary outcomes with an adjusted odds ratio (95% confidence interval) of 1.6 (1.3–1.9) for major morbidity, 1.9 (1.4–2.4) for ROR, and 2.6 (1.4–4.6) for mortality. In addition, preoperative sepsis (OR, 5.0; 95% CI, 4.4–5.8) and septic shock (OR, 15.4; 95% CI, 9.0–26.2) were strongly predictive of postoperative major morbidity as well as mortality (sepsis OR, 3.1; 95% CI, 1.8–5.2; septic shock OR, 22.1; 95% CI, 9.7–50.5). Lastly, increasing age was associated with increased mortality and increasing ASA class was associated with increased morbidity on multivariable analysis (Tables 4–6).

Discussion

Incision and drainage is the most commonly utilized

Table 4
Multivariable model for major morbidity.

Variable	Multivariable Odds Ratio (95% CI)	Multivariable *p* value
Age (Reference: < 34 years)	34–45 years: 1.0 (0.8–1.2)	0.86
	46–55 years: 1.0 (0.8–1.1)	0.61
	>55 years: 1.2 (1.0–1.4)	0.12
Race (Reference: Non-Hispanic White)	Hispanic White: 1.2 (0.9–1.4)	0.17
	Black/African American: 1.1 (0.9–1.3)	0.29
	Asian: 0.8 (0.6–1.2)	0.29
	Other: 1.3 (1.1–1.5)	0.01
Sex (Reference: Male)	Female: 1.2 (1.0–1.3)	0.01
Immunosuppression	**1.6 (1.3–1.9)**	**<0.01**
Preoperative Systemic Sepsis (Reference: No)	SIRS: 1.6 (1.3–2.1)	<0.01
	Sepsis: 5.0 (4.4–5.8)	<0.01
	Septic Shock: 15.4 (9.0–26.2)	<0.01
Obese (Reference: No)	Yes: 0.9 (0.8–1.1)	0.24
	Missing: 0.8 (0.6–1.1)	0.21
Weight loss > 10% in prior 6 months	1.7 (1.2–2.5)	<0.01
Diabetes	1.0 (0.9–1.2)	0.76
History of severe COPD	1.2 (0.9–1.6)	0.26
Hypertension	1.1 (1.0–1.3)	0.19
Pre-op acute renal failure	1.5 (0.8–2.9)	0.21
Pre-operative WBC > 10.5 (Reference: No)	Yes: 1.1 (0.9–1.2)	0.46
	Missing: 0.5 (0.4–0.6)	<0.01
Transfusion > 4 units PRBCs in 72 h prior to surgery	4.7 (3.1–7.1)	<0.01
ASA Class (Reference: I/II)	III: 1.6 (1.4–1.8)	<0.01
	IV/V: 2.7 (2.1–3.4)	<0.01
Emergency Case	1.1 (0.9–1.2)	0.29
Procedure (Reference: I and D)	I and D plus Fistulotomy: 0.8 (0.5–1.4)	0.38
	I and D plus Seton Placement: 0.8 (0.5–1.2)	0.23
Abscess location by CPT (Reference: 46060)	CPT 45000: 2.2 (1.1–4.5)	0.03
	CPT 45005: 1.2 (0.6–2.2)	0.64
	CPT 45020: 1.4 (0.7–2.6)	0.33
	CPT 46040: 1.0 (0.6–1.8)	0.98
	CPT 46045: 1.1 (0.6–2.0)	0.70

Table 5
Multivariable model for return to the operating room.

Variable	Multivariable Odds Ratio (95% CI)	Multivariable *p* value
Immunosuppression	1.9 (1.4–2.4)	<0.01
Diabetes	1.0 (0.8–1.3)	0.73
Current smoker	1.1 (1.0–1.3)	0.17
Preoperative Systemic Sepsis (Reference: No)	SIRS: 1.2 (0.9–1.7)	0.22
	Sepsis: 1.8 (1.5–2.2)	<0.01
	Septic Shock: 2.2 (1.0–4.6)	0.04
Weight loss > 10% in prior 6 months	1.9 (1.1–3.1)	0.01
Pre-operative WBC > 10.5 (Reference: No)	Yes: 1.1 (0.9–1.3)	0.46
	Missing: 0.8 (0.6–1.1)	0.12
ASA Class (Reference: I/II)	III: 1.3 (1.1–1.5)	0.01
	IV/V: 1.3 (0.9–1.9)	0.19
Emergency Case	1.1 (0.9–1.3)	0.46
Procedure (Reference: I and D)	I and D plus Fistulotomy: 0.7 (0.4–1.5)	0.39
	I and D plus Seton Placement: 1.3 (0.8–2.0)	0.22
Transfusion > 4 units PRBCs in 72 h prior to surgery	1.7 (0.9–3.0)	0.09
Abscess Location by CPT (Reference: 46040)	45000: 2.6 (1.5–4.4)	<0.01
	45005: 1.1 (0.7–1.6)	0.68
	45020: 1.0 (0.6–1.6)	0.96
	46045: 1.3 (0.9–1.8)	0.16
	46060: 1.0 (0.5–2.1)	0.97

Table 6
Multivariable model for mortality.

Variable	Multivariable Odds Ratio (95% CI)	Multivariable *p* value
Age (Reference: < 34 years)	34–45 years: 2.3 (0.7–7.3)	0.17
	46–55 years: 2.8 (0.9–8.8)	0.08
	>55 years: 7.8 (2.7–22.7)	<0.01
Obese (Reference: No)	Yes: 0.5 (0.3–0.9)	0.02
	Missing: 0.9 (0.3–2.5)	0.82
Immunosuppression	**2.6 (1.4–4.6)**	**<0.01**
Diabetes	1.5 (0.8–2.5)	0.18
History of Severe COPD	2.8 (1.4–5.7)	<0.01
Hypertension	1.2 (0.7–2.0)	0.59
Weight loss > 10% in prior 6 months	6.1 (2.9–12.7)	<0.01
Preoperative Systemic Sepsis (Reference: No)	SIRS: 1.5 (0.5–4.3)	0.49
	Sepsis: 3.1 (1.8–5.2)	<0.01
	Septic Shock: 22.1 (9.7–50.5)	<0.01
Transfusion > 4 units PRBCs in 72 h prior to surgery	7.1 (3.5–14.8)	<0.01

intervention for perianal sepsis, and it is thought of as a benign outpatient operation. However, we found that immunosuppressed patients may require a different mindset with regard to the management of perianal sepsis. Patients on chronic immunosuppression who require incision and drainage of perianal sepsis were nearly twice as likely to suffer a major complication and had a mortality rate three times higher than immunocompetent patients following I & D. This relationship persisted on multivariable analysis, and it indicates the need for heightened awareness in the postoperative period after I and D in immunocompromised patients.

We identified that nearly 20% of the immunocompromised patients suffered at least one major complication postoperatively. This number is difficult to contextualize because though perianal sepsis is a common problem, short-term outcomes remain largely understudied. Most published series are dated and have evaluated either oncology patients on chemotherapy or patients with HIV/AIDS.[6–8,19] Munoz-Villiasmil et al.[20] included patients immunocompromised for additional reasons including inflammatory bowel disease and diabetes in their series of 66 patients, and reported impaired wound healing in 9% of patients. However, they did not comment on any other complications, and the study lacked a control group, so it is impossible to comment on how these patients compared to immunocompetent patients treated in the same period. Other studies that have included only patients with a malignancy on active chemotherapy have reported postoperative complication rates of up to 20%.[21] Once again due to small sample sizes (all N < 100), absence of control groups, and frequent non-operative management, the results are difficult to interpret.[5,21,22] Our study has the advantage of containing a large number of immunosuppressed patients as well as a large control group of immunocompetent patients and the ability to specifically investigate outcomes after operative treatment. Therefore, we were able to determine that although immunocompetent and immunocompromised patients with perianal sepsis present with sepsis at a similar rate, immunocompromised patients are at increased risk of developing sepsis in the postoperative period. Current guidelines based on expert opinion advocate postoperative antibiotics in immunosuppressed patients, and our findings further endorse this recommendation. Though the need for intraoperative cultures has been questioned recently,[3,23] they would be helpful to maximize antibiotic sensitivity. This is especially true in immunosuppressed patients to allow de-escalation of antibiotic therapy as patients clinically improve and antibiotic sensitivities return.

Along with the increased rate of postoperative sepsis in the immunocompromised patients, an increased need for ROR was observed. This could occur secondary to several factors including incomplete drainage at the index operation, recurrence due to an unidentified fistula at the index operation, or an inability for immunocompromised patients to mount a response and clear any

residual infection after I & D. As fistulectomy/fistulotomy and seton placement were more frequently performed in addition to abscess drainage in the immunosuppressed population, it is unlikely that postoperative sepsis is an issue of a missed fistula. Further, immunosuppressant use was independently predictive of ROR supporting the theory that ROR is due to an inability to clear the infection in the immunocompromised population. Given the reluctance to bring immunocompromised patients to the operating room for incision and drainage due to higher perceived perioperative risks[5] and the occasional success of non-operative management,[5,6,24] it is essential that an operation when performed achieves a thorough exam with complete drainage. Recurrence may also be reduced by admission with continuation of antibiotics. A recent study demonstrated a 50% reduction in recurrence after I & D with postoperative antibiotics in patients with extensive cellulitis or preoperative sepsis.[3] Though this study included only one immunosuppressed patient, these findings are likely transferable to immunosuppressed patients.

The mortality rate was also significantly higher in the immunocompromised group than the immunocompetent group. Our mortality rate of 1.8% is similar to the 2% mortality rate shown by Badgwell et al. in patients undergoing I & D while receiving chemotherapy.[5] While seemingly high for an 'outpatient' procedure, these rates are still better than the reported >50% mortality rate in the initial studies of I & D for perianal sepsis in cancer patients.[19,25] Improved mortality is likely a reflection of earlier detection and a larger armamentarium of antibiotics. As preoperative sepsis and septic shock were the strongest predictors of mortality, there is a continued need for early intervention in both immunosuppressed and immunocompetent patients before systemic spread of bacteria occurs, as well as a need for postoperative antibiotic coverage in both immunocompromised patients and those patients who present with sepsis.[2] Likewise, increasing age was associated with increased mortality and likely represents increased susceptibility to sepsis and an impaired immune response.[26]

Given the increased morbidity and mortality after I & D of perianal sepsis in immunosuppressed patients, there is a clear need to improve treatment in this patient population. Several possible interventions may help achieve optimal outcomes. First, prompt I & D of any identified anorectal abscess will limit the spread of the infection. Second, antibiotics should be started preoperatively and continued in the postoperative period. Third, collection of intraoperative cultures should be considered so that antibiotic therapy can be de-escalated postoperatively. Lastly, there may be an increased need for acute, inpatient surveillance during the postoperative period to enable any early intervention if complications develop and long-term surveillance to ensure proper wound healing.

No study to date has demonstrated a benefit for postoperative antibiotics following an I & D for perianal sepsis, and therefore there is not a recommendation to routinely collect intraoperative cultures. However, this may be a reflection of prior studies including only immunocompetent patients, where antibiotics have a limited role. Two key factors appear to support the collection of intra-operative cultures in the proper circumstances. First, the American Society of Colon and Rectal Surgeons clinical practice guidelines[2] recommend the continuation of postoperative antibiotics in high-risk populations, and thus cultures are a logical adjunct to allow better tailoring of postoperative antibiotic therapy as detailed above. Second, with the increasing incidence of hospitalizations for methicillin resistant staphylococcus aureus (MRSA) positive in the United States,[27,28] it is possible more abscesses are being caused by MRSA. These abscesses are not covered by the typical gut flora specific antibiotics that are prescribed after I & D of perianal sepsis.[3] Two studies in the United States have evaluated the prevalence of MRSA in perianal sepsis cultures. They found that it is the causative organism in up to 34% of patients,[29] and that there was inadequate antibiotic coverage 66% of the time.[30] Thus, in order to ensure coverage of MRSA if present, and to be good antibiotic stewards,[31] the obtainment of intra-operative cultures should be considered when antibiotic therapy is going to be prescribed postoperatively. These do remain suggestions based on the limited data available and further study on the utility of cultures in immunosuppressed patients is warranted.

Although this is the largest study on the impact of immunosuppression on outcomes after I & D of perianal sepsis, there are several limitations related to its utilization of the ACS-NSQIP database. First, since outcomes are truncated at 30 days, we cannot assess wound healing in the immunosuppressed population or the immunocompetent patients and see if there is a difference. Second, specific immunosuppression regimens and the doses are not known, so we cannot ascertain if certain medications or doses of medications are associated with more risk than others are. Similarly, we cannot assess the impact of immunosuppressive disease such as HIV/AIDS on outcomes after incision and drainage of perianal sepsis since these patients would not be captured by the NSQIP definition of immunosuppression. Third, there may be an inherently lower threshold to return to the operating room in immunosuppressed patients due to the increased risk of impaired infection resolution. Fourth, post I & D antibiotic usage and duration is not recorded, so we cannot assess compliance or lack thereof with this recommendation in the immunosuppressed population, and likewise we cannot determine if any immunocompetent patients were placed on antibiotics postoperatively. Lastly, by utilizing the NSQIP database, we are only able to capture abscesses deemed to warrant drainage in the operating room and thus possibly more severe than those drained in the outpatient clinic setting or in the emergency department.

Conclusion

Immunosuppressed patients endure significantly increased rates of major morbidity, need for ROR, and mortality than immunocompetent patients following an I & D for perianal sepsis. Since systemic sepsis is the most frequent postoperative complication, improved postoperative care in immunocompromised patients including intra-operative cultures and admission for antibiotic therapy until clinical improvement is seen could potentially improve outcomes and would allow for tailoring of antibiotic therapy based on local sensitivities.

Conflicts of interest

The authors (Nicholas McKenna, Katherine Bews, Omair Shariq, Elizabeth Habermann, Robert Cima, and Amy Lightner) of the article "Incision & Drainage of Perianal Sepsis in the Immunocompromised: A Need for Heightened Postoperative Awareness" do not have any conflicts of interest to declare.

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