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Published In/Presented At

Steele, A. Murphy, R. X. (2017, March). *Comparison of Complication Rates for Different Surgical Treatments in the Management of Hidradenitis Suppurativa*. Poster Presented at: 2017 SELECT Capstone Posters and Presentations Day. Kasych Family Pavilion, Lehigh Valley Health Network, Allentown, PA.

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Comparison of Complication Rates for Different Surgical Treatments in the Management of Hidradenitis Suppurativa

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Introduction

Hidradenitis suppurativa is a complicated, chronic inflammatory dermatologic condition characterized by comedone-like follicular inclusions. Although the exact underlying mechanism of disease is still disputed, leading theories suggest apocrine gland or pilosebaceous unit involvement. Clinically, the disease is manifest by the development of painful nodules, abscesses, sinus tracts, and hypertrophic scarring of the skin. Hidradenitis may occur anywhere on the body but is most common at the intertriginous zones of the axillary, inframammary, inguinal, and perineal skin. Risk factors for the development of hidradenitis include smoking, obesity, and female sex and there is a higher incidence in African Americans.

Treatment of the disease is exceptionally challenging and consists of both non-surgical and surgical options. Conservative measures are generally indicated for earlier stage disease and consist of antibiotics, glucocorticoids, and retinoids, among others. Surgical intervention is indicated for severe or refractory disease and is the only definitive option for cure. When surgery is performed, the local excision of diseased tissue often results in a large, contaminated defect that requires closure and reconstruction to preserve both function and cosmesis. Reconstructive methods include closure by secondary intention, primary intention, skin grafting, and fasciocutaneous and myocutaneous flaps. The body of literature on the surgical treatment shows no consensus on a superior closure technique. The present study seeks to build upon this knowledgebase by considering three possible surgical reconstructive options and all of their significant complications.

Problem Statement

The current study aims to identify a superior closure technique for the surgical treatment of hidradenitis suppurativa based on the most clinically significant complication rates. Excision of diseased hidradenitic tissue results in a soft tissue defect that must be closed using one of a variety of reconstructive options. Here, we consider the post-operative complication rates of three closure methods performed at Lehigh Valley Health Network—primary closure, local flap closure, and skin grafting—to both contribute to the body of literature on the topic and propose a best closure method.

Methodology

A retrospective chart review of all patients who underwent surgical reconstruction for hidradenitis suppurativa at Lehigh Valley Health Network from January 1, 2004 to December 31, 2014 was performed. First, all patient records with a diagnosis of “Hidradenitis Suppurativa” as identified by ICD-9 code 705.83 were gathered within the EPIC electronic medical record database. To ensure only those patients who underwent surgical excision were included, the CPT codes 11451, 11450, 11462, 11470, 11463, and 11471 were required to be listed in the chart. Patients were then stratified according to type of surgical reconstruction performed, including primary closure, skin graft, or local flap. Data was tabulated in a secure Microsoft Excel spreadsheet for simpler analysis.

Patient charts were reviewed for documentation of all relevant complications for each individual operation and operative site: DVT, PE, seroma, hematoma, wound dehiscence, superficial surgical site infection (SSI), flap loss, graft loss, transfusion requirement, unplanned post-operative emergency department (ED) visit, unplanned post-operative hospital admission, unplanned post-operative return to the operating room (OR), and recurrence at the operative site within and after one year of the operation.

Results

In total, 401 operative sites for 189 operations of 103 individual patients were reviewed. The average patient age was 35.0 years. At time of operation, 87 patients were current smokers, 18 had a remote smoking history, 33 had diabetes mellitus, and 34 had hypertension. There were 201 closures performed by primary closure technique, 193 by local flap, and 7 by skin grafting. There were no incidences of DVT, PE, or transfusion requirement for any patient.

The sites closed by primary intention had rates of 27.36%, 7.46%, and 30.85% for wound dehiscence, superficial surgical site infection (SSI), and total recurrence, respectively. Local flap closures had rates of 43.01%, 8.81%, and 36.27% for wound dehiscence, superficial SSI, and total recurrence, respectively. For the skin graft closures, only 1 site (14.29%) experienced wound dehiscence and 1 site superficial SSI. There were no episodes of recurrence for skin graft closures, but 3 sites experienced partial graft loss that required some healing by secondary intention. Partial graft loss was defined as 10-90% loss based on national complication database criteria. Table 1 below shows the collective findings for the recorded complications and Figure 1 depicts the three most prevalent complications.

Complication	Primary Closure	Local Flap Closure	Skin Graft Closure
DVT	0%	0%	0%
Pulmonary Embolism	0%	0%	0%
Seroma	0%	0.52%	0%
Hematoma	1%	1.04%	0%
Superficial SSI	7.46%	8.81%	14.29%
Wound Dehiscence	27.36%	43.01%	14.29%
Partial Flap/Graft Loss	N/A	1.55%	42.86%
Unplanned ED Visit	5.9%	7.25%	0%
Unplanned Return to OR	2.99%	2.59%	28.57%
Unplanned Hospital Admission	2.99%	4.15%	0%
Recurrence < 1 Year	18.91%	19.17%	0%
Recurrence > 1 Year	11.94%	17.10%	0%
Total Recurrence	30.85%	36.27%	0%

Table 1. 30-day complication rates for all considered complications for primary, local flap, and skin graft closure.

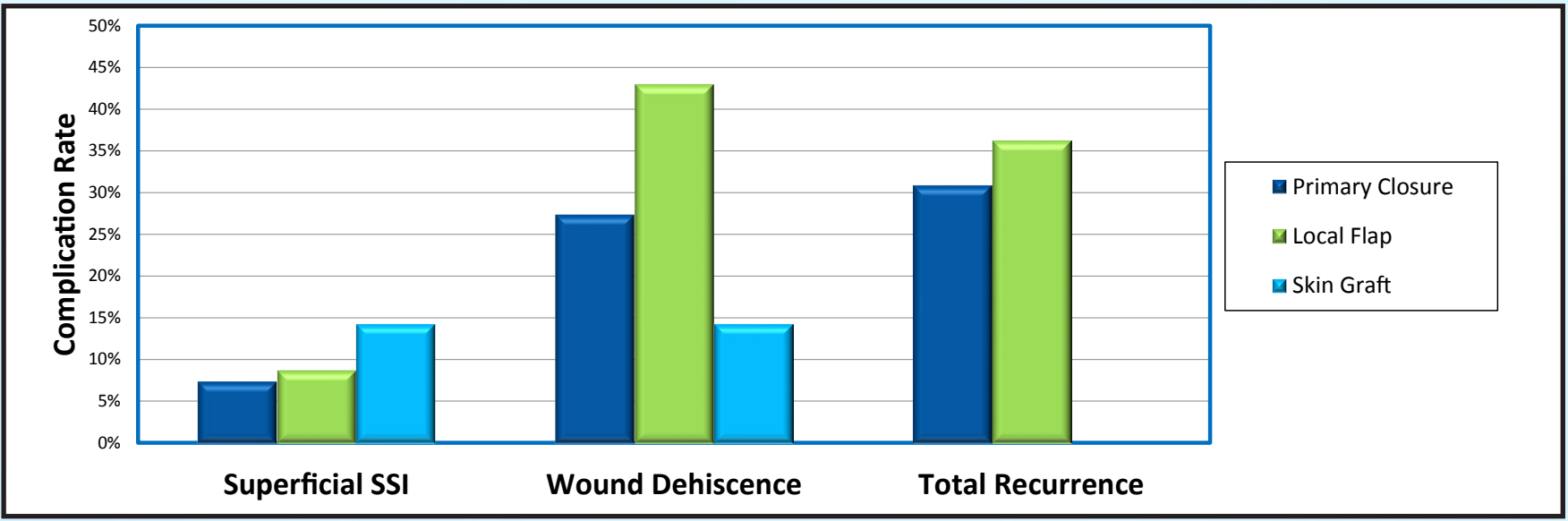


Figure 1. Complication rates of the three most prevalent complications for primary, local flap, and skin graft closures.

SELECT Integration

As the surgical treatment of hidradenitis continues to be investigated, the primary goal is to improve patient outcomes by having fewer complications. Indeed, this applies directly to the “Better Care” aspect of The Triple Aim, which we have studied directly within the Health Systems domain of the SELECT curriculum. In general, complications of any surgical operation are financially taxing to the healthcare system and result in decreased value for patients over the course of their treatment. As hidradenitis may affect up to 4% of the population,² determining a best practice closure method following excision can be of substantial savings to the health system—the “Better Cost” principle of The Triple Aim—even if surgical intervention is only reserved for those patients with later stage disease. A consensus within the plastic surgery field on superior method of closure has the potential to minimize all of the complications considered in the present study, resulting in the liberation of healthcare resources including time, personnel, and money for devotion to other endeavors.

Lastly, this project is directly relevant to patient-centered care. Presently, reconstructive options for patients following excision may be dependent on individual surgeon preference or institution policy. Subsequently, patients may not always be receiving the best evidence-based reconstructive options. By adding to the body of literature that suggests skin grafting is superior to other methods, the plastic surgery field may be one step closer to confirming this reconstruction method as the best choice for patient outcomes and surgeons will be able to offer patients choices with greater context.

Discussion

The aim of this project was to identify a superior closure technique based on post-operative complication rates for the three chief closure methods at Lehigh Valley Health Network. After the review of 401 operative sites for 103 patients, we have shown that skin grafting is superior to primary and flap closure in our patient population based on lower recurrence, wound dehiscence, and superficial SSI rates (Table 1). However, the small number of skin graft reconstruction cases was small compared to the two other methods. Our complication rate findings are consistent with other previous investigations^{10,11,18} and add to the body of evidence that suggests a shift in the surgical treatment paradigm in favor of skin grafting for severe and refractory hidradenitis.

Several limitations of this project presented themselves during the data collection and analysis process. As aforementioned, the review of each patient record required the assessment of three charts, including one paper chart and two electronic medical records. This introduced a significant challenge in collection of data points as relevant data was located in any or all of the record types. It also substantially prolonged the time required for collection. Next, determining whether or not a hidradenitis lesion represents residual or recurrent hidradenitis can be challenging for clinicians and some charts were not precise in stating whether or not a given lesion was residual, remaining diseased tissue from a prior incomplete excision, or recurrent, a true new lesion. The common waxing and waning course of hidradenitis further complicates this issue for clinicians.

In addition to providing valuable treatment and outcomes data for the Lehigh Valley Health Network patient population, the data recorded in this study can also be used in the future for both academic and quality improvement purposes. Perhaps most evident is that the data reported above may now be compared to other similar studies in hidradenitis surgical outcomes research. Also, as mentioned above, the data serves as further evidence that skin grafting should be considered before primary and local flap closure, at least in consenting patients with appropriate wound bed. Tracking Operations and Outcomes for Plastic Surgeons (TOPS) is a national database program launched in 2002 by the American Society of Plastic Surgeons that strives to collect self-reported outcomes data as a practice management, research, and advocacy tool for the specialty and its patients. By submitting the data reported here to TOPS in the future, it could be compared to the national database's outcomes for these procedures. Indeed, one of the goals of TOPS is to help physician leaders and plastic surgeons determine national benchmarks and practice patterns and our data could be a valuable piece of that process.

Conclusions

The data reported in this study show that superficial wound dehiscence, superficial SSI, and recurrence are the major post-operative complications in patients that undergo surgical excision of hidradenitis with either primary or flap closure. Skin grafting for wound closure appears to have lower rates of these three complications, but the number of operative sites closed by this method in the studied patient population was small. These results further support the idea that skin grafting after excision of hidradenitis, at least for resultant wounds with appropriate wound beds, is superior to primary intention and local flap reconstruction methods. Future studies with a larger number of skin graft closure cases are required for validation of this study and to suggest a shift in surgical treatment methodology.

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