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Scar acceptance after pediatric urologic surgery

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Summary

Introduction
Patients undergo pediatric urologic surgery as infants and young children.

Objective
The purpose of the study was to evaluate the evolution of surgical scars over several years in order to inform parents and surgeons on the true cosmetic impact of pediatric surgery and evaluate patient scar satisfaction.

Study design
This was a cross-sectional study where patients who have undergone urologic surgery at a young age are evaluated years later for scar satisfaction via an abbreviated validated questionnaire. Scar length currently was measured and compared with immediate postoperative scar length to assess for growth.

Results
Eighty-two children were evaluated with a median age (interquartile range) at the time of surgery and at the time of the study of 1 year (0.6–3 years) and 7 years (3–11 years), respectively. Pyeloplasty (48.8%), ureteral reimplantation/ureterocele reconstruction (41.5%) and other (9.8%) surgical techniques were included. No bother was reported in 84.0% of families. Surgical approach (robotic/laparoscopic vs. open) did not influence whether families reported very pleased/pleased versus neutral/somewhat bothered attitudes ($p = 0.094$). At time of surgery median scar length for all open surgical approaches ($N = 65$) was 4 cm (IQR 4–4.5 cm) and at time of the study scars were 6 cm (IQR 5–8 cm). For laparoscopic incisions, median length at time of surgery was 0.8 cm (IQR 0.8–1.1 cm) and at a mean follow up time of 2.3 years median scar length was 1.1 cm (IQR 1–1.5 cm). By race, Asian experienced the lowest percent change in scar length 0.3%, then Caucasian 0.8%, Latino 1.4% and self-described other ethnicity 2.0%.

Discussion
As predicted, scars grow in length over time in either open or minimally surgical approaches. Depending on patient race, scar growth varied. Regardless, survey results did not vary based on surgical approach, type of surgery or race of survey taker Summary figure.

Conclusions
The majority of families are pleased with overall scar appearance after undergoing major pediatric urologic surgery. Scars tend to grow in length overtime with less growth noted in Asian children and flank incisions.

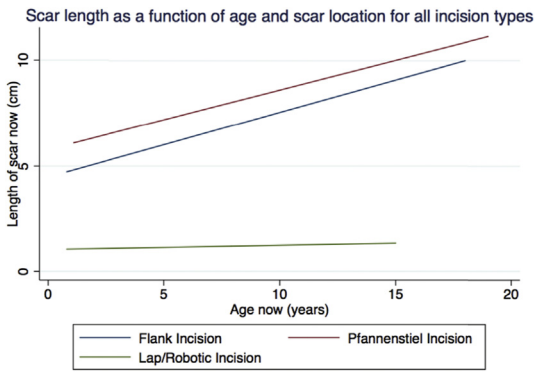

Figure Overlapping graph of flank, Pfannenstiel and laparoscopic/robotic incisions by age at the time of study representing growth of scars over time.

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Introduction

In decades past, surgical intervention was performed strictly open with little or no minimally invasive approaches available until the late 1970s and early 1980s [1]. With current technology, surgery can range from open to minimally invasive with subsequent varying scar lengths. For pediatric urology patients, laparoscopy and robotic surgery has become more popular in the past several years, which leads to varied scar placement depending on trocar port layout. For example, in an open ureteral reimplantation a Pfannenstiel incision can be inconspicuously hidden under the underwear line while a robotic approach spreads small incision on the upper and mid-abdomen. Additionally, studies have demonstrated that scar length and appearance is a driving factor in patient preference of approach of surgical intervention [2,3]. Placement of robotic ports beneath a Pfannenstiel line allows for hidden scar location and has been shown to be preferred by patients and parents which was demonstrated using the HIDES technique, or hidden incision endoscopic surgery [4]. While several studies have been performed regarding surveys and questionnaires surrounding patient and family satisfaction, there are limited data about scar length over time as a child grows for either the minimally invasive or the open surgical approach.

Aims and hypotheses

We hypothesize that scars grow in length over time, but the question remains how scars grow in proportion to growth of the child. Additionally, we sought to determine whether parents and patients are affected by the appearance of their surgical scars from pediatric urologic surgeries. Our study aims to address the following questions: (1) Do scars grow over time when performed on pediatric patients? (2) Do scars grow in a greater proportion than normal childhood growth? (3) Is there a difference between minimally invasive scar growth and open surgical scar growth? (4) What are parents and patients perceptions of their scar? We hope by answering these questions we can help provide information for both the patients and parents regarding changes in pediatric scar growth throughout childhood.

Materials and methods

Patient sample

Approval was obtained from the University of California San Francisco Institutional Review Board prior to beginning the study. Children were considered eligible for the study if they had undergone a major pediatric urologic surgery by a single surgeon. The major pediatric urologic surgery included in the study was the following: open pyeloplasty, robotic pyeloplasty, open ureteral reimplantation, ureterocele reconstruction, laparoscopic nephrectomy, and laparoscopic heminephrectomy. Surgery had to have been performed at least 6 months from time of current evaluation. Children who had not at least 6 months from time of surgery and those who underwent inguinal orchidopexy or herniorrhaphy were excluded from the study. Orchidopexy/herniorrhaphy patients were excluded because these scars are relatively unobtrusive since they are located within a well-hidden inguinal crease.

Children were seen in clinic for routine postoperative evaluation and had their scars photographed alongside a standardized metric ruler for measurement purposes to obtain current scar length values in centimeters. In patients that had undergone robotic or laparascopic procedures, the most visible scar was photographed and measured (upper quadrant port site). Abbreviated validated surveys that were adapted from the Patient Scar Assessment Questionnaire were given to both parents (or guardians) if present and to the child if they were over the age of 7 [5]. Children under 7 years of age did not receive surveys. An abbreviated 10-question version of the Patient Scar Assessment Questionnaire was utilized so that it could retain the attention of the child and parent, alike.

Since this was a cross-sectional study, scar length at the time of surgery was obtained by reviewing all operative reports for incisional length. In those patients who did not have incisional length recorded at the time of operation, average incisional estimates were used. Measuring approximately the incision in 10 patients at the end of surgery after skin had been sutured, we were able to create average incisional estimates for Pfannenstiel and flank incisions. Since a single surgeon performed surgeries, we felt this applicable to previous patients who had undergone the same surgical approach. For children who had minimally invasive surgery, only a single laparoscopic incision was measured and the most prominent scar was utilized. In our study we found this to be the supraumbilical incision as the remaining scars were hidden in the umbilicus or the inguinal crease.

Race information was collected by reviewing patient information listed within our electronic medical record system which is self-reported by families. Ethnicity options included Hispanic or Not Hispanic or Latino. Race options included White or Caucasian, African American or Black, Asian, and Other. Other ethnicity was self-described by the family and included patients of mixed race and those not identifying as any the listed options.

All survey data and scar length were imported in RedCap research database.

Statistical analysis

To evaluate if scars increased in size in relation to abdominal circumference, the percent change in scar length was calculated using the following equation: [(current scar length/age matched abdominal circumference) − (operative scar length/age-matched abdominal circumference)]

The age-matched abdominal circumference was obtained from the Center for Disease Control records, which record average body parameters for years 2011−2014 from infants through adulthood [6].

Kruskal−Wallis analysis was utilized to determine statistical significance in scar growth between open flank and Pfannenstiel incisions. Multiple patient and survey characteristics were then evaluated by simple regression analysis, and the chi-square and Mann−Whitney rank-sum tests to

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