Abstract

Methods: Retrospective case series review of all children who underwent 2-FPP by the attending surgeon (J.J.M.). Fifty-five consecutive patients were analyzed over a 5.5 year period. Study variables were obtained from multidisciplinary craniofacial/cleft records. All patients underwent 2-FPP with intravelar veloplasty utilizing the suture technique described herein. No patients were excluded from primary review.

Results: Eighty-nine percent of patients were Veau class 2 or 3. Twenty-four (44%) patients had an associated syndrome. Patients with a lower Veau class were 3.6 times more likely to have an associated syndrome (p=0.0001). Two (4%) patients developed a fistula. There was no association between Veau class, presence of an associated syndrome, or use of dermal allograft with the development of a fistula (p=0.10, 0.25). Postoperative velopharyngeal insufficiency (VPI) was noted in 11 (20%) patients, without association between Veau class, syndrome, or dermal allografting (p=0.10, 0.74, and 0.35, respectively). Repairs in the first half of the patient sample had a 14-fold increased risk of postoperative VPI (p=0.0024).

Conclusion: Our use of an exposed inverted horizontal mattress suture for nasal mucoperiosteal closure during 2-FPP appears safe, and is comparable to the lowest published rates of postoperative fistula and VPI. Further standardized studies are needed in this area.

Introduction

Because the occurrence of a postoperative fistula can adversely affect the development and persistence of articulation defects, several studies have investigated the optimal timing and surgical technique for reduction in fistula rates. By far the most common reason for reoperation after cleft repair is for correction of velopharyngeal insufficiency (VPI); however, as many as 63% of patients who develop a postoperative fistula require reoperation for the fistula as the sole indication. Furthermore, fistula recurrence is a particularly challenging problem, with a 37-100% recurrence rate after reversion.

Published postoperative fistula rates from primary palatoplasty range from 2.5-20%. The variable range in fistula rates have reportedly been influenced by: age, type of repair, staged procedures, Veau Class, presence of syndrome, and other factors.

The purpose of our study was to report fistula outcomes using a new suture technique for nasal mucoperiosteal closure described herein. To our knowledge, this represents the first such report. Secondary analyses were performed to assess the effects of patient demographics, cleft characteristics, surgeon experience, and associated syndromes on the development of both fistula and VPI.

Methods and Surgical Technique

Fifty-five consecutive patients who underwent a standard 2-flap palatoplasty (2-FPP) with intravelar veloplasty by the attending surgeon (J.J.M.) over five years were reviewed. Suture technique is demonstrated in Figure 2. Patients were examined once per week postoperatively, again at three months, and with yearly follow up for asymptomatic patients.

Study variables included: age at time of surgery, sex, Veau classification, and presence of comorbid syndrome. Outcomes included: use of dermal allograft, length to last follow up, and presence and location of postoperative fistula. Speech and language pathology records were also accessed for presence of postoperative VPI. To analyze the effects of surgeon experience, first vs. second half study sample were compared.

Statistical Analysis Software® (SAS Institute, Inc., Cary, NC, USA) was used to analyze collected study variables. The Mantel-Haenszel Exact Chi-Square test examined trends and outcomes by Veau class, where the Fisher's Exact Test was utilized for instances of dichotomous variables and Veau class groupings (1&2 vs. 3&4.) A t-test assessed differences in mean age of first vs. second half patients, fistula, and VPI.

Mean age at time of repair was 399 days (median: 350; range: 174-973; SD: 151). Thirty-six (65%) of patients were female. The majority of patients (89%) were Veau classes 2 and 3. Patients with a lower (grouped 1&2) Veau class were more likely to have an associated syndrome compared to higher (grouped 3&4) Veau class (p=0.0001). Twenty-four (44%) patients had an associated syndrome.

Postoperative Fistula: Neither mean age (p=0.45) nor sex (p=0.46) were associated with fistula. Figure 3(A) demonstrates no significant associations between study variables and development of fistula. Twenty (4%) of our patients developed a fistula. The first was a female, Veau class 3 with no associated syndrome, repaired at 248 days. The second was a male, Veau class 2 with a partial (21g22.3) chromosome 21 deletion repaired at 392 days with use of dermal allograft.

VPI: Neither mean age (p=0.30) nor sex (p=0.19) were associated with development of VPI. First half patient sample was associated with a 14-fold increased risk of VPI (p=0.0024). Other study variables demonstrated no effect on VPI. Figure 3(B).

Dermal Allograft: Dermal allografting was utilized in 8 (15%) patients and was not associated with Veau Class (p=0.58) or syndrome (p=0.28).

Results

Discussion

The primary goal of cleft palate repair is velopharyngeal competence without fistula formation, which can create challenges and often refractory management issues. Surgical outcome data in these patients are confounded by a lack of uniform study design, exclusion criteria, and classification schemes in the literature. Our study addressed several of these short-comings by including well-matched samples sizes of patients with lower (45%) and higher (55%) Veau classes, as well as syndromic (44%) and non-syndromic (56%) patients. No patients were excluded from the study and we analyzed a single surgeon’s experience on a single operative procedure while making use of a strict definition of fistula.

In contrast to our results, we did not identify Veau class or associated syndrome as a risk for development of fistula or VPI. The positive correlation between our first half of patients and postoperative VPI may be attributable to older mean age at repair (which approached statistical significance; 437 days vs. 361, p=0.06) rather than surgeon inexperience. We identified no association between dermal allograft use (15% of patients) and adverse outcomes.

Conclusions

Our use of a novel exposed inverted horizontal mattress suture technique for nasal mucoperiosteal closure demonstrates a safe and easily incorporated modification to the classic two-flap palatoplasty while circumventing the theoretical complications of later maxillofacial repair by virtue of its primary closure. Furthermore, our outcomes are comparable to the lowest reported postoperative fistula and VPI rates after primary repair of the cleft palate. Additional prospective studies in this area are needed to determine the optimal surgical management of cleft patients.

References