MAXILLARY GROWTH AND SPEECH OUTCOMES FOLLOWING STAGED PALATOPLASTY: A SINGLE-CENTER APPROACH

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INTRODUCTION

Cleft lip and palate are the most common craniofacial abnormalities in children, yet there is a lack of consensus on ideal treatment strategies for these patients. Early repairs lead to better speech outcomes, whereas later repairs have improved maxillofacial growth. A two-stage approach has been suggested as a balance: intra-velar veloplasty performed at 3 months with cleft lip repair allows for most speech development during the critical period, with a delayed hard palate repair at 18 months to minimize the deleterious effect of palatoplasty on maxillary growth.

Previous studies have reported varying success, but were not able to conclude with any generalizable recommendations for surgical treatment. These studies often had problems regarding inconsistency in the timing of the second stage and evaluation of speech outcomes, as well as a lack of large-scale controlled studies or inconsistent speech analysis.

Therefore, we conducted a large scale retrospective study at a single center in which timing of two-staged closure was controlled. We investigated speech and maxillofacial growth outcomes with the hope that the systematic reporting of our experience will provide further clarity on the optimal approach to treating patients with cleft palates.

METHODS AND MATERIALS

We performed an IRB-approved, retrospective chart review of 54 patients who underwent initial surgical treatment of cleft palate at Children's Medical Center in Dallas between January 2006 and January 2012. All patients in the study underwent staged palatoplasty: intra-velar veloplasty at 3 to 6 months and hard palate repair at approximately 18 months.

Speech outcomes were evaluated based on Pittsburgh Weighted Speech Scores (PWSS) and rates of secondary operations indicated for correction of VPI. PWSS is a quantitatively clinical scale that evaluates five components (facial grimace, nasality, nasal emissions, phonation, and articulation) on a scale from 0-37. A score of 7 or above is the threshold for clinical velopharyngeal incompetence (VPI). PWSS were collected after completion of staged palatoplasty, postoperatively after any surgical correction of VPI, and at latest available patient follow up. Maxillary growth outcomes were evaluated by rates of oronasal fistula, reoperation indicated for palate repair and Angle class malocclusion.

Exclusion criteria for this poster included patients undergoing single stage repair, initial treatment at an outside center, secondary surgery at an outside center, inadequate follow up or evaluation data and syndromic diagnoses.

SPEECH OUTCOMES

Variables	All Patients (%)		CP (%)	CLP (%)
No.	54		11	43
Age at primary operation (mo)	4.3; 18.0		4.0; 17.8	4.4; 18.0
Avg. PWSS after 1st operation	3.5		4.7	3.2
Pts with VPI	14 (26)		3 (27)	11 (26)
Pts undergoing VPI surgery	15 (28)		5 (45)	11 (26)
PWSS after VPI correction	2.1		2.5	2.0
Pts with VPI post-VPI surgery	7		1 (9)	6 (14)

Variables	Complete (%)	Incomplete (%)
No.	43	11
Age at primary operation (mo)	4.4; 18.0	4.2; 17.8
Avg. PWSS after 1st operation	3.3	4.4
Pts with VPI	11 (26)	3 (27)
Pts undergoing VPI surgery	12 (28)	4 (36)
PWSS after VPI correction	2.1	2.1
Pts with VPI post-VPI surgery	6 (14)	1 (27)

Variables	Unilateral (%)	Bilateral (%)
No.	29	14
Age at primary operation (mo)	4.1; 18.1	4.9; 17.9
Avg. PWSS after 1st operation	2.6	4.6
Pts with VPI	5 (17)	6 (43)
Pts undergoing VPI surgery	6 (21)	6 (43)
PWSS after VPI correction	1.5	3.4
Pts with VPI post-VPI surgery	2 (7)	4 (29)

MAXILLARY GROWTH OUTCOMES

Variables	All Patients (%)		CP (%)	CLP (%)
No.	54		11	43
Oronasal fistula(s)	17 (31)		3 (27)	14 (33)
Underwent fistula repair(s)	16 (30)		3 (27)	13 (30)
Avg. time to first repair (mo)	79.3		58.7	84.0
No malocclusion	16 (30)		4 (36)	12 (28)
Class I malocclusion	9 (17)		3 (27)	6 (14)
Class II malocclusion	2 (4)		1 (9)	1 (2)
Class III malocclusion	27 (50)		3 (27)	24 (56)

Variables	Complete (%)	Incomplete (%)	Unilateral (%)	Bilateral (%)
No.	43	11	29	14
Oronasal fistula(s)	15 (35)	2 (18)	7 (24)	8 (57)
Underwent fistula repair(s)	14 (33)	2 (18)	6 (21)	8 (57)
Avg. time to first repair (mo)	89.6	62.9	90.5	75.0
No malocclusion	12 (28)	4 (36)	8 (28)	4 (29)
Class I malocclusion	6 (14)	3 (27)	6 (21)	0 (0)
Class II malocclusion	1 (2)	1 (9)	0 (0)	1 (7)
Class III malocclusion	24 (56)	3 (27)	15 (52)	9 (64)

RESULTS

After primary repair and prior to receiving any corrective surgery, 26% of patients were determined to have clinical VPI, with a 3.5 average PWSS. 28% required corrective VPI surgery. 11% were determined to have residual VPI refractory to corrective surgery. The final average PWSS for all patients after all corrective VPI surgery was 2.1. Maxillofacial growth outcomes were reported for our entire cohort of patients. 31% were found to have a persistent oronasal fistula, and 30% underwent surgical repair. We found 30% had no malocclusion, 17% with class I, 4% with class II, and 50% with class III malocclusion. There were no significant differences when including syndromic patients.

Outcomes were then reported comparing cleft lip/palate (CLP) to isolated cleft palate (CP), complete to incomplete CP, and unilateral to bilateral clefts. The lowest rates of clinical VPI and surgical VPI correction were observed in patients with CLP, complete CP and unilateral clefts, as compared to CP, incomplete CP and bilateral clefts respectively. The lowest rates of fistulas and malocclusions were observed in patients with CP, incomplete CP and unilateral clefts, as compared to their counterparts.

DISCUSSION

Studies on palatoplasties report average fistula rates from 14-27%[1], with higher rates seen in patients with bilateral clefts and complete clefts. Our own rates fall within this range as well. Including syndromic patients in the analysis gives similar results.

Comparing speech results is more challenging due to a lack of standardization in assessing outcomes. Using PWSS, our observed rates of VPI were 26% post-primary repair and 11% post-corrective repair. These rates fall within the generally reported range of 15-25%[2,3]. Despite the trend towards single-stage palatoplasty, our data suggests that the staged-approach is still a valuable option for these patients.

While early results are promising, maxillofacial growth in our cohort needs to be followed up at skeletal maturity. Additionally, despite the clear benefits of a quantitative speech score, the inclusion of articulation in PWSS may artificially raise observed rates of VPI. Due to surgeon preference, some oronasal fistulas are intentional at time of primary operation and observed rates of oronasal fistula may not always represent a failure of treatment.

REFERENCES

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