

Complications following Posterior Pharyngeal Flap Surgery

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Since 1955, 222 patients from the Cleft Palate Clinic of the Children's Hospital of Philadelphia have had posterior pharyngeal flaps constructed to treat velopharyngeal incompetence. The need for operation was decided upon jointly after evaluation of the patients by the members of the Cleft Palate Clinic team. These decisions were usually supported by speech testing and radiologic evaluations.

The indication for surgery was the consistent demonstration of a significant degree of velopharyngeal incompetence. The majority of operations were carried out before the age of seven years.

Methods and results: Twenty-one patients had velopharyngeal incompetence due to neurological deficits on an anatomical basis in the absence of a palatal cleft. Fifty-two patients with wide clefts and short palates had pharyngeal flaps constructed at the time of their palatal closure. In the largest group, comprising 65 percent of the total, 149 procedures were carried out in patients with velopharyngeal incompetence after a prior palatal closure. Seven of the patients whose initial construction of a posterior pharyngeal flap failed had a second operation performed (Table 1).

Nearly equal numbers of superiorly and inferiorly based flaps were done. 109 flaps were superiorly based, 98 were inferiorly based, and the position of fifteen flaps was not available from the charts.

All operations were performed by one of several staff surgeons or by a resident surgeon under their supervision.

In two patients, large tonsils were resected to insure a reasonable airway postoperatively. If a superiorly based flap was constructed, the palate was often divided in the midline for exposure.

The choice between superiorly and inferiorly based flaps was made by the operating surgeon, with some preference for inferiorly based flaps if

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TABLE 1. Posterior pharyngeal flap operation in 222 patients, 1956-1971.

no cleft of palate.....	21
done with primary palatal closure.....	52
done after palatal closure for V.P.I.....	149
reconstruction of flaps after dehiscence.....	7
total.....	229

technically feasible. Mucosal flaps for lining were used on the raw surfaces of the pharyngeal flaps. The posterior pharyngeal wall was loosely approximated after elevation of the flap. At the end of the surgical procedure a careful search for bleeding vessels was made. Only rarely was it necessary to ligate bleeding vessels.

Management of the airway postoperatively was of vital importance. Most patients had a tongue traction suture placed at the conclusion of the operative procedure, and left in place for 24-48 hours. Patients in whom the intubation was difficult, the operation was prolonged, or who developed croup postoperatively were placed in high-humidity tents for at least 24 hours. Patients were positioned prone after extubation until recovery from the anesthetic. Recently, in the anticipation of airway problems in some patients, we have inserted and sutured in place an armored nasopharyngeal tube with the internal end extending just beyond the flap. This tube is irrigated frequently with saline solution to maintain its patency. The tube is removed two to four days later after the acute postoperative edema has subsided.

Antibiotic therapy was not used routinely, but was reserved for those patients with signs of acute otitis media when myringotomies were done at the time of surgery.

Only one patient died, a child with multiple congenital anomalies, including severe neurological abnormalities.

Airway obstruction of major degree developed in 8 patients, 7 of whom required tracheostomy. Six of the tracheostomies were done in patients with associated congenital anomalies, usually the micrognathia of the Pierre Robin syndrome. In one patient an emergency tonsillectomy for airway obstruction was carried out 12 hours postoperatively.

Blood transfusions for major hemorrhage were required in only 7 patients. However, minor bleeding occurring postoperatively did lead to some airway problems.

Partial or complete separation of the flap from the palate was the most common single complication in 7% of cases. Ten of these separations were complete. Such dehiscence was more commonly observed in inferiorly based flaps (13 cases) than in superiorly based flaps (4 cases). However, the superiorly based flap cannot be inspected easily so that some cases of partial separation may have gone undetected.

Twelve children (5%) had significant persistent nasal obstruction fol-

TABLE 2. Complications following posterior pharyngeal surgery in 222 patients.

death.....	1
emergency tonsillectomy.....	1
worsening of speech.....	1
hemorrhage (received transfusions).....	7
tracheostomy.....	7
partial separation of flap.....	8
complete separation of flap.....	10
persistent significant nasal obstruction.....	12

TABLE 3. Analysis of complications.

	<i>timing of operative procedure</i>			
	<i>with primary palate closure</i>	<i>as secondary correction after palate closure</i>	<i>for V.P.I. without cleft palate</i>	<i>total</i>
partial separation of P.P.F.				
inferior.....	0	4	1	5
superior.....	0	2	0	2
complete separation of P.P.F.				
inferior.....	2	6	0	8
superior.....	0	2	0	2
nasal obstruction				
inferior.....	0	4	0	4
superior.....	4	4	0	8
tracheostomies				
inferior.....	1	0	0	1
superior.....	3	3	0	6

lowing surgery, usually complaining of snoring, mouth breathing, and inability to blow the nose clear of mucous. Seven of these patients had surgical revision of the flap to relieve their symptoms. Superiorly based flaps had been used in 8, and inferiorly based flaps had been used in 4 of these patients with persistent severe nasal obstruction (Tables 2 and 3).

Preoperative and postoperative speech evaluation, including examination by a speech pathologist and a battery of tests, was available in 54 patients (Table 4). Deterioration of speech was found in only one patient, and no improvement in speech quality was noted in an additional 7 patients. 85% or 46 of the 54 patients, had significant improvement in quality of speech as measured by multiple techniques.

Discussion

Nylen and Wahlen (1) reported hemorrhage to be the major complication in their series of patients in 1966. This was similar to the experience

TABLE 4. Speech evaluation pre- and post-operatively in 54 patients having posterior pharyngeal flaps constructed.

<i>class of palatal cleft</i>	<i>changes in speech recorded</i>			
	<i>unchanged</i>	<i>improved</i>	<i>worse</i>	<i>total</i>
II	3/10	7/10	0	10
III	3/31	27/31	1/31	31
IV	1/13	12/13	0	13
Total	7/54	46/54	1/54	54

of Owsley and his associates (2) who had an eight percent incidence of bleeding in seventy-nine patients undergoing posterior pharyngeal flap operations.

Walden and his co-workers (3) have suggested the use of tracheostomies routinely for these patients, but with careful anesthetic techniques many acute perioperative and postoperative problems have been avoided in our series. Most patients do have to have tongue traction sutures placed at the conclusion of their operative procedure and removed after 24 to 48 hours. Any patients in whom intubation was difficult or the operation prolonged are placed in a humidified croup tent for twenty-four hours. Currently an armored nasopharyngeal tube is placed with its internal end just beyond the posterior pharyngeal flap until the acute postoperative edema has subsided in patients in whom concern about the adequacy of the airway exists.

In general the superiorly based flap seemed to produce a significant degree of obstruction and the inferiorly based ones had a greater tendency to breakdown or partially separate (Table 3). The position of the flap did not affect the quality of the speech, both types being equally effective in correcting velopharyngeal incompetence. None of the patients were noted to have increased problems with obstructive otitis media after either type of flap.

The analysis of the postsurgical results from the standpoint of speech effectiveness makes it clear that the posterior pharyngeal flap should certainly be considered in the course of the total rehabilitation of the child with a cleft palate. Whenever indications are appropriate for this procedure intervention should not be unduly delayed. Clinical observations indicate that even minor amounts of velopharyngeal incompetence do not generally correct themselves and tend to increase with age. Therefore in our experience total surgical management of the cleft palate problem should be carried out before considering long term intensive speech therapy. Such therapy is more likely to be successful if the speech therapist can initiate the needed therapy with palatal structures that are physiologically as normal as possible. Otherwise, significant alterations in palatal

structure or function can nullify the results of previously and often tediously acquired velopharyngeal and articulation habits.

Care must be taken in electing to perform a superiorly based posterior pharyngeal flap in conjunction with a cleft palate closure in patients in whom one might expect a higher incidence of postoperative airway obstruction (e.g. children with Pierre Robin syndrome). In addition one may anticipate a slightly higher frequency of persistent nasal obstruction following the use of superiorly based posterior pharyngeal flaps.

Summary

1. Posterior pharyngeal flaps are an asset in the correction of velopharyngeal incompetence, whether used at the time of palatal closure, as a second staged operation after a prior palatal closure, or in patients who have velopharyngeal incompetence without a palatal cleft.

2. The procedure should not be postponed once consistent velopharyngeal incompetence is diagnosed. Its construction should be carried out before considering intensive, prolonged speech therapy.

3. Complications following the construction of posterior pharyngeal flaps are most frequent in children with micrognathia or other severe congenital anomalies. These children require exceptional preoperative, operative and postoperative evaluation and care. An armoured nasal tube may be utilized postoperatively to insure an adequate airway.

4. In children with a high expectation of postoperative airway obstruction, as in Pierre Robin syndrome, caution should be exercised before deciding to combine a posterior pharyngeal flap and a palatal closure at a single operation.

5. If the tonsils are excessively large, particularly in small children, we recommend a tonsillectomy be done at the time of the posterior pharyngeal flap operation.

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