

# Intensive Care Unit Monitoring After Pharyngeal Flap Surgery: Is It Necessary?

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**Purpose:** To assess the incidence of perioperative complications and the utility of intensive care monitoring in patients undergoing posterior pharyngeal flap surgery for velopharyngeal dysfunction (VPD).

**Materials and Methods:** This study was a retrospective evaluation of patients who underwent posterior pharyngeal flap surgery for treatment of VPD and an assessment of the incidence of perioperative complications. Descriptive statistics were computed.

**Results:** Over an 18-year period, 145 patients underwent pharyngeal flap surgery for VPD; 133 (91.7%) had complete data and were included as subjects. Mean patient age was  $9.4 \pm 7.4$  years; 50.4% were female. One hundred twenty-six patients (94.7%) had a history of cleft palate. Thirty-four patients (25.5%) had asthma or obstructive sleep apnea. Eighty-three patients (62.4%) were admitted to the intensive care unit (ICU) for postoperative monitoring. The average length of hospital stay was  $1.9 \pm 0.9$  days (range, 1 to 5 days). There were no incidents of serious postoperative complications, including death, bleeding, flap dehiscence or loss, or airway compromise requiring reintubation. Two patients (1.5%) had perioperative complications related to respiratory issues, one of whom required readmission to the ICU (0.8%). There were no differences in complications between those who were routinely admitted to the ICU and those who went directly to the floor ( $P = 1.00$ ). There was no association between respiratory comorbidities and complications ( $P = .06$ ).

**Conclusion:** The perioperative complication rate for posterior pharyngeal flap surgery is low (<2%). Routine ICU admission for monitoring is not necessary.

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*J Oral Maxillofac Surg* ■:1-5, 2016

Children with velopharyngeal dysfunction (VPD) exhibit characteristic speech pathologies, such as hypernasality, nasal emission, and articulation errors.<sup>1-17</sup> These result from the failure of the velopharyngeal port to completely close during speech, allowing

pressure waves to escape in part through the nasopharynx as opposed to the oropharyngeal route. In patients with velopharyngeal insufficiency (VPI), apposition of the velum to the posterior and lateral pharyngeal walls is not achieved because of different

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Received September 3 2016

Accepted November 9 2016

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0278-2391/16/31177-6

<http://dx.doi.org/10.1016/j.joms.2016.11.010>

113 anatomic problems. Several surgical modalities,  
114 including Furlow palatoplasty, sphincter palatoplasty,  
115 and posterior pharyngeal flap procedures, have been  
116 designed to aid in velopharyngeal port closure.<sup>1,6</sup>  
117 The choice of treatment is guided by gap size,  
118 velopharyngeal closure pattern, type of cleft, and  
119 extent of lateral wall motion.<sup>1,5-8</sup>

120 Among the most useful procedures for VPD correc-  
121 tion is the posterior pharyngeal flap. In this procedure,  
122 a superiorly or inferiorly based myomucosal flap is  
123 raised off of the perivertebral fascia and secured to  
124 the velum.<sup>2-5,7,8</sup> Thus, the flap blocks the central  
125 velopharyngeal port allowing residual lateral  
126 pharyngeal wall motion to complete closure. Studies  
127 have shown that properly executed pharyngeal flap  
128 surgery can correct VPD in more than 95% of  
129 patients, with most patients achieving normal  
130 perceptual speech.<sup>2</sup> Recent studies also have docu-  
131 mented its relative safety.<sup>3,4,14,16</sup> However, when  
132 complications do occur in this procedure, they can  
133 be severe. These complications include ascending  
134 meningitis, life-threatening bleeding, sleep apnea,  
135 and airway compromise.<sup>3-9,13-16</sup>

136 Because of the urgency of addressing these complica-  
137 tions, some centers have recommended intensive care  
138 monitoring during the initial 24 hours after surgery.<sup>16</sup>  
139 Others have disputed the utility of intensive monitoring,  
140 reporting a low incidence of serious complications  
141 when patients were admitted to regular pediatric inpa-  
142 tient units.<sup>3,4</sup> In the era of cost containment, the  
143 additional costs of intensive care monitoring for all  
144 patients could be an unnecessary expenditure for a  
145 procedure with a low complication rate.

146 The purpose of this study was to review outcomes  
147 of pharyngeal flap surgery for VPI at the authors' insti-  
148 tution over an 18-year period, with an emphasis on im-  
149 mediate postoperative complications necessitating  
150 intensive care. The primary hypothesis was that inten-  
151 sive care monitoring would not be necessary for im-  
152 mediate postoperative care in this population. To address  
153 this hypothesis, the specific aims were to 1) identify a  
154 cohort of patients who underwent pharyngeal flap sur-  
155 gery for VPD at the authors' institution and 2) assess  
156 the incidence of complications in the immediate post-  
157 operative period.

## 159 **Materials and Methods**

### 160 **STUDY DESIGN**

161 This was a retrospective evaluation of patients who  
162 underwent pharyngeal flap surgery for treatment of  
163 VPD. Patients were included as study subjects if they  
164 were treated at the senior author's institution, had  
165 complete data on postoperative complications and  
166 care, and had complete pre-, intra-, and postoperative  
167 records. Patients who were treated at other local  
168

169 centers and those with incomplete records were  
170 excluded, as were those who required intensive care  
171 monitoring for other institutional protocols (eg,  
172 nursing protocols for patients with pre-existing trache-  
173 ostomies and patients requiring intensive care moni-  
174 toring for combined procedures, severe obstructive  
175 sleep apnea [OSA], etc). All patients included as study  
176 subjects underwent correction of VPD using a superi-  
177 orly based pharyngeal flap by 1 of 3 surgeons. The  
178 setting for postoperative monitoring was based on sur-  
179 geon preference. For patients admitted to the inten-  
180 sive care unit (ICU) postoperatively, transfer to the  
181 floor was based primarily on their ability to indepen-  
182 dently maintain airway without serious desaturations  
183 (oxygen saturation, <94%), cardiopulmonary stability,  
184 and absence of acute postoperative respiratory events.  
185 The project was approved by the institutional review  
186 board for human studies.

### 187 **STUDY VARIABLES**

188 Study variables were classified as predictors and out-  
189 comes. Predictor variables were factors potentially  
190 associated with a risk of adverse events in the immedi-  
191 ate postoperative period: gender, age at surgery  
192 (years), associated syndromic diagnosis, congenital  
193 cardiac condition, neuromuscular condition, pulmo-  
194 nary condition (eg, OSA, asthma, or vocal cord paraly-  
195 sis), type of cleft (no cleft, submucous cleft palate,  
196 Veau I to IV), length of hospital stay (days), ICU admis-  
197 sion (yes or no), and duration of ICU stay (days). Pa-  
198 tients who were not admitted to the ICU were  
199 admitted to an inpatient floor with continuous oximet-  
200 ric monitoring. The primary outcome measurement  
201 was complication during the immediate postoperative  
202 period. Complications included bleeding, respiratory  
203 distress, reintubation, stridor, desaturation, flap  
204 complication, infection, or death.

### 205 **STATISTICAL ANALYSES**

206 Data for patients were recorded, de-identified, and  
207 entered into a statistical database (SPSS 23.0, SPSS  
208 Inc, Chicago, IL) for analysis. Descriptive statistics  
209 were computed for the study sample. Bivariate statis-  
210 tics and regression analyses were planned to assess  
211 risk factors for perioperative complications. For all an-  
212 alyses, a *P* value less than or equal to .05 was consid-  
213 ered statistically significant.

## 214 **Results**

215 Over an 18-year period (1998 through 2015), 145  
216 patients underwent pharyngeal flap surgery for a pri-  
217 mary diagnosis of VPD associated with cleft palate.  
218 Of these, 133 (91.7%) had complete records and  
219 were included as study subjects. The mean patient  
220 age was  $9.4 \pm 7.4$  years (range, 3.4 to 41.2 years).  
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