(Jurnal Plastik Rekonstruksi, 2024; Vol 11, No 2, 44-49)

CRANIOFACIAL

Article

BOTTLE VERSUS SYRINGE FEEDING AFTER PALATOPLASTY: A SYSTEMATIC REVIEW

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ABSTRACT

Introduction : Postoperative feeding after palatoplasty should be initiated immediately to maintain nutritional intake while preserving the palatal sutures to avoid trauma or tension that can lead to wound rupture. Currently, there is no consensus on post-palatoplasty preferred feeding method. This study aims to compare bottle versus syringe feeding in post-palatoplasty patients.
Method : A systematic search was conducted in five databases namely PubMed, Embase, Scopus, ProQuest, and CINAHL, with the following keywords; palatoplasty, cleft palate repair, bottle feeding, syringe feeding, outcome, complication, growth, and nutrition. The selected studies were critically appraised using the Oxford CEBM (Centre for Evidence-Based Medicine) critical appraisal tools.
Result : Two studies were included, with a total of 162 subjects. Both studies found that the formation of postoperative wound dehiscence and weight gain did not significantly differ between bottle and syringe groups. However, faster weight gain was observed in the bottle group. Habits and cultural factors could influence the outcomes of these studies.
Conclusion: Bottle feeding is not significantly inferior to using syringe in terms of short-term postoperative complications, and can be used as an alternative feeding method for post-palatoplasty patients.

***Keywords**: Cleft palate, Palatoplasty, Feeding, Syringe, Bottle*

Latar Belakang: Pemberian makan pasca operasi palatoplasti harus dimulai segera untuk mempertahankan asupan nutrisi sekaligus menjaga jahitan palatal agar terhindar dari trauma atau tegangan yang dapat menyebabkan ruptur luka. Saat ini, belum ada konsensus mengenai metode pemberian makan yang disarankan setelah palatoplasti. Penelitian ini bertujuan untuk membandingkan pemberian makan menggunakan botol dengan pemberian makan menggunakan syringe pada pasien pasca palatoplasti.
Metode: Pencarian sistematis dilakukan pada lima basis data, yaitu PubMed, Embase, Scopus, ProQuest, dan CINAHL, dengan kata kunci berikut: *palatoplasty*, *cleft palate repair*, *bottle feeding*, *syringe feeding*, *outcome*, *complication*, *growth*, dan *nutrition*. Studi yang terpilih dinilai secara kritis menggunakan alat penilaian kritis Oxford CEBM (Centre for Evidence-Based Medicine).
Hasil: Dua studi dengan total 162 subjek dimasukkan dalam analisis. Kedua studi tersebut menunjukkan bahwa kejadian dehiscence luka pasca operasi dan peningkatan berat badan tidak berbeda secara signifikan antara kelompok botol dan syringe. Namun, peningkatan berat badan yang lebih cepat diamati pada kelompok botol. Kebiasaan dan faktor budaya dapat memengaruhi hasil dari studi-studi ini.
Kesimpulan: Pemberian makan menggunakan botol tidak secara signifikan lebih rendah dibandingkan penggunaan syringe dalam hal komplikasi pasca operasi jangka pendek, dan dapat digunakan sebagai metode alternatif pemberian makan bagi pasien pasca palatoplasti.

***Kata Kunci:** Langit-Langit Sumbing, Palatoplasti, Pemberian Makan, Syringe, Botol*

Conflicts of Interest Statement:
The author(s) listed in this manuscript declare the absence of any conflict of interest on the subject matter or materials discussed.

Received: 03-01-2024, Revised: 17-08-2024, Accepted: 28-08-2024

 P-ISSN 2089-6492; E-ISSN 2089-9734 | DOI: 10.14228/jprjournal.v11i2.369

INTRODUCTION

Cleft lip and palate (CLP) are the most common congenital craniofacial abnormalities found in the world. The prevalence of cleft lip and palate is 0.3 and 0.33 in a thousand live births respectively.[1] In Indonesia, the incidence of cleft lip and cleft palate is estimated at 1-2 cases per thousand live births.[2]

Children with cleft palate are at risk of speech, hearing, and social development disorders, as well as malnutrition.[3–5] Timely surgery and multidisciplinary care play an important role in preventing morbidity and complications.[4] Postoperatively, adequate nutrition is important for recovery. After palatal surgery, the sutured wounds may be ruptured. This is generally caused by tension on wound closure, poor compliance with postoperative care and wound infection.

Feeding techniques after cleft palate surgery can vary greatly, especially after palatoplasty. The method of feeding is directly related to short-term complications including suture integrity. Food administration via syringe (syringe feeding) and pacifiers (bottle feeding) are the two most popular methods. In our center, giving milk via breastfeeding or pacifier is generally not recommended immediately after palatoplasty, due to the hypothesized increase of pressure on the surgical scar, triggering the formation of dehisence or fistulas.[8,9] Feeding via syringe can increase the risk of rejection from the baby, inhibiting adequate nutrition and possibly impeding growth.[10] Augsornwan et al in their study revealed that despite the risk of increasing the possibility of post-operative complications, babies who were fed with breast milk or post-palatoplasty pacifiers were calmer in receiving food compared to using a spoon or syringe, enabling adequate nutrition.[11] There is no consensus or guideline regarding the feeding method after palatoplasty.[9,12]

This systematic review aims to compare short-term outcomes (short-term weight gain and wound dehisence) between pacifier feeding and syringe feeding in babes post-palatoplasty. The findings from this systematic review can provide guidelines for the preffered method of feeding after palatoplasty.

METHOD

This systematic review was carried out by 3 different authors (LP, RA, KB) on August to December 2023. Due to the nature of this study, an ethical clearance was not required. The three researchers contributed in idea conception, literature search, data extraction, data analysis, and manuscript writing. The systematic review was conducted according to the protocol recommended by the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) statement.[13]

The review was carried out on PubMed, Embase, Scopus, ProQuest and CINAHL databases. Keywords used for primary search were "cleft palate", "palatoplasty", "cleft palate repair", "bottle feeding", "syringe feeding", "outcome", "complication", "growth", and "nutrition".

Inclusion criteria are systematic reviews, randomized clinical trials (RCT), cohorts and cross-sectional studies with manuscripts available in English. The studies must have a population of children 0-24 months old divided into groups of different feeding methods (bottle feeding vs. syringe feeding) and observed for short-term palatoplasty outcomes, namely wound dehiscence and weight gain in the first 90 days after surgery. Primary outcomes should include short-term post-palatoplasty outcomes, specifically wound dehiscence and weight gain within the first 90 days post-surgery. Secondary outcomes include post operative complications such as fistula formation.

Exclusion criteria include case series, case reports, studies not directly comparing feeding methods, and those that did not mention short-term post-palatoplasty outcomes.

After study selection, critical appraisal on case-control and cohort studies was carried out with the Newcastle-Ottawa Scale (NOS),[14] non-randomized intervention studies were assessed with ROBINS-I,[15] and randomized studies were assessed using Cochrane RoB 2.[16]

RESULTS

Figure 1 presents the PRISMA flow diagram of the study. A total of 648 studies were screened, and 642 were excluded due to irrelevance. Six studies were retrieved, but three studies were excluded due to being literature reviews and

P-ISSN 2089-6492; E-ISSN 2089-9734 | DOI: 10.14228/jprjournal.v11i2.369

irrelevance, resulting in a total of three studies assessed for eligiblity. One study was not available in full-text and was excluded from this review. Searching through website revealed three studies which were ineligible for this review, hence was excluded. Only two studies were included in the review.

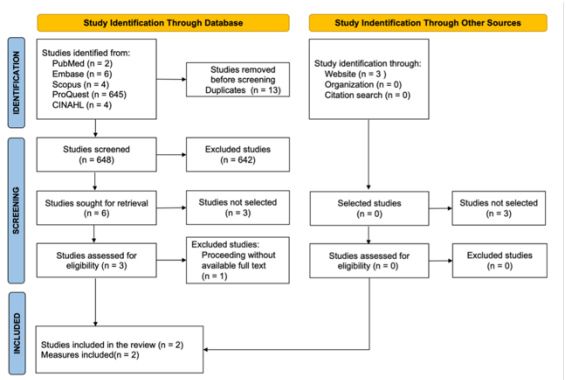

Figure 1. PRISMA flow diagram of this study.

Table 1 presents the studies included in this review. Critical review of the studies by Cohen et al17 and Kim et al18 showed good results in selection, comparability and outcomes, so that both studies can be categorized as good quality studies. The studies were published in 1992 and 2009 respectively with study locations in the United States and South Korea. Overall, this study involved 162 subjects who included patients with cleft lip, cleft lip, and cleft lip with cleft lip.

The study by Kim et al involved more male patients with a mean age of 7.8-8.1 months. Meanwhile, the study by Cohen et al involved children aged four days to 12 months. The study by Kim et al recorded a balanced degree of severity between Veau 1,2, and 3. Both studies separated their subjects into two groups; syringe feeding and bottle feeding by pacifier. Follow-up varied between two months to five years. The observed outcomes were postoperative wound complications and weight gain.

Qualitative analysis in both studies revealed no significant difference in wound dehisence between the two groups. Cohen et al[17] reported one subject with wound dehisence in the syringe group. However, the wound rupture was not considered as a direct result of the feeding technique. They also reported postoperative fistula in one subject in the syringe group and one subject in the bottle group.

Kim et al[18] reported one case of dehisence in the bottle group which healed immediately after conservative management. The number of oronasal fistula cases in the bottle and syringe group (4 vs 5) and the average complication (11.9% vs 12.5%) was not significantly different. Qualitative analysis on weight gain revealed contrasting results between the two studies. Kim et al[18] reported no significant difference in relative weight gain within the first and second months after surgery, while Cohen et al[17] observed better weight gain in the bottle group.[17] Kim et al[18] also mentioned increased oral intake in the bottle group after the 6th postoperative day.

DISCUSSION

The feeding protocol after corrective surgery for oral clefts is still a matter of debate among medical personnel involved in cleft care. In the United States, many craniofacial surgery centers use feeding protocols that are not supported by strong scientific evidence. Several studies reported that postoperative wound complications was not so much affected by feeding methods, but rather by adequate nutritional intake.[19] Feeding methods also vary in different centers, such as restricting bottles and recommending exclusive breastfeeding for 30 days, or restricting breastfeeding or bottles and using spoons, cups syringes, and nasogastric tubes (NGT) as to prevent pressure on the surgical wound.[12,20-22]

Minimizing crying is considered one of the most important factors in preventing pressure at the surgical site.[8] Assunção et al[10] showed that 21.7% of babies who were given milk via spoon on the first post-operative day refused feeding by crying and/or moving their heads laterally. Further, babies who were given food through nipples or pacifiers that had been used before did not convey significant resistance.[10] Augsornwan et al[11] found that babies who were given food through breast milk or bottles were calmer than those with spoon or syringe. Changes in the way of feeding can cause the baby to cry, thereby increasing pressure on the surgical wound.[8] Despite that, there is not enough studies to support these theories.[9,12,23]

Bottle feeding is the most common method to feed babies with cleft lip and palate. A study by Gil-da-Silva-Lopes et al[29] on 215 babies with CLP reported pacifier to be the best method to feed CLP babies, especially those who were not

P-ISSN 2089-6492; E-ISSN 2089-9734 | DOI: 10.14228/jprjournal.v11i2.369

Table 1. Study results

Author/ Year/ Study design	Population	Intervention	Results	Recommendation
Cohen et al/ 1992/ Retrospective Cohort	80 consecutive patient's post- cleft lip and/or palate repair	Protocol A: restricted feeding by tube and a syringe for 7 days (after cleft lip repair) and 10 days (after cleft palate repair) Protocol B: bottle and nipple feeding immediately after cleft lip repair/1st day after cleft palate repair	1 patient in Protocol A had partial lip dehiscence due to technical error. All other patients in both groups healed primarily. There were 2 postoperative fistulae after palatal repair, one in each group. No significant differences in final scars/ speech outcomes in both groups. Patients were followed from 8 months to 5 years. Subjectively observed, weight gain was better in Protocol B children.	After cleft lip repair: • Offer clear liquid with nipple when fully awake • Advance to milk/formula with bottle/breast as tolerated After cleft palate repair: • Nothing by mouth on the day of surgery • Clear liquid with cup on first postoperative day • Advance to clear milk/formula when tolerated • Advance to appropriate soft diet by spoon
Kim et al/ 2009/ prospective randomized study	82 post-palatoplasty patients	Protocol G1: liquid foods by bottle/ nipple-feeding Protocol G2: all types of foods by spoon/ cup/ syringe	• No significant complication in both groups (bleeding, respiratory problem) • 1 patient in G1 had wound dehiscence • Oronasal fistula in 4 patients in G1, 5 patients in G2 • Although statistically insignificant, G2 infants ingested a larger amount of food and lower amount of sedatives during the first 2 days. • Relative weight gain in the first- and second-month post-op in G1 was 6.4% and 10.3%, and in G2 5.1% and 9.3% ($p>0.05$)	Post-operative bottle feeding may be associated with more pain during the first 2-3 days after surgery, but did not lead to increased wound disruption/ fistula formation. Initial pain may prevent infants from vigorous sucking which might be harmful for healing. Bottle feeding could be attempted immediately post palatoplasty, since it did not affect early postoperative outcomes.

breastfed. Studies by Cohen et al[17] and Kim et al[18] found no difference in short-term complications between post-palatoplasty babies who received food via bottle feeding and syringe feeding. Kim et al reported no difference in weight gain between the two methods, but Cohen et al[17] reported increased weight gain in bottle-fed subjects. The faster weight gain observed in the bottle-feeding group might indicate that bottle feeding allows for more efficient and consistent nutritional intake post-surgery. This could be due to the baby's familiarity with the bottle, which might reduce resistance to feeding and increase the amount of food intake. Additionally, bottle feeding might be less cumbersome and time-

P-ISSN 2089-6492; E-ISSN 2089-9734 | DOI: 10.14228/jprjournal.v11i2.369

consuming than syringe feeding, allowing for more frequent and larger volume feedings.[17,18]

Despite being the most popular, studies comparing bottle feeding with pacifiers with syringe feeding in post-palatoplasty patients is limited. A study by Trettene et al[20] on 44 CLP babies post-palatoplasty found that spoon feeding provided better outcomes compared to cup-feeding. De Vries et al[25] revealed that NGT feeding on post-palatoplasty patients results in greater feeding difficulty in 67% cases, as well as difficulty to seal the soft palate, impaired sucking, and impaired overall eating ability.[25] In contrast, Ize-Iyamu et al[26] showed that breastfeeding resulted in significantly higher rate of in weight gain compared to cup and spoon feeding, with respective weight gains of 0.7 kg vs. 0.4 kg on week 10 and 0.8 kg vs 0.4 kg on week 14.[26]

Feeding practices are often influenced by cultural norms and beliefs. For example, in some cultures, bottle feeding might be more common due to easier access to bottles or a cultural preference for this method over syringe feeding. Some also believe that breastfeeding is considered safe and a must; especially in infants under 6 months of age.[27] Additionally, beliefs regarding the impact of feeding methods on healing and the baby's comfort might also play a role in decision-making process. These cultural factors can potentially influence the outcomes, as practices that align with cultural norms might result in better adherence and, consequently, better nutritional outcomes.

Study limitations

This study is can provide an overview for clinicians to choose the best feeding method for post-palatoplasty patients, considering early surgical complications and weight gain. However, this study is limited by the small number of studies regarding the topic. Despite the unlimited year of publication, we have only been able to collect two studies comparing bottle feeding with syringe feeding in post-palatoplasty patients. Further high-quality studies on this topic is necessary to provide better understanding on post-palatoplasty feeding and establish a recommendation for health personnels working in cleft care

CONCLUSION

Based on the findings of this review, clinicians might consider bottle feeding as a viable alternative to syringe feeding for post-palatoplasty patients. Given that there was no significant difference in short-term postoperative complications between the two methods, and that bottle feeding may lead to faster weight gain, it could be recommended, especially in cases where the baby shows resistance to syringe feeding. However, further high-quality studies are necessary to provide stronger evidence before establishing definitive clinical guidelines.

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FINANCIAL DISCLOSURE STATEMENT

No funding or support was received for this article.

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P-ISSN 2089-6492; E-ISSN 2089-9734 | DOI: 10.14228/jprjournal.v11i2.369