

EVALUATION OF THE ROLE OF THE "TADPOLE" ISLAND FLAP IN THE REPAIR OF POSTOPERATIVE PALATAL FISTULAE

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ABSTRACT

Objective: To retrospectively evaluate the role of tadpole (mucoperiosteal island) flap in palatal fistula repair.

Study Design: Descriptive retrospective study.

Place and Duration of Study: It was conducted at Military hospital Rawalpindi and cleft hospital Gujrat from November 2010 to September 2014.

Material and Methods: Total 38 patients underwent island tadpole flap, two layer, closure of palatal fistula. All patients with palatal fistulae following repair of congenital cleft palate along with recurrent fistulae, i.e., those occurring after one or more previous attempts at fistula repair were included. Patients with asymptomatic fistulae, history of palate repair of less than 6 months duration and fistulae other than those developing after cleft palate repair were excluded from the study; these latter included congenital and infectious causes. Experienced surgeons performed all the repairs and results were evaluated by using SPSS version 17.

Results: Surgery was considered successful on complete anatomical closure of fistula. Thirty-eight patients, 23 (60.5%) males and 15 (39.5%) females, underwent surgery for palatal fistula repair. There were 32 (84.2%) anterior fistulae whilst the remaining 6 (15.8%) were located at the junction of soft and hard palate. The mean fistula size was 8 mm \pm 1.6 mm, ranging from 6 mm to 15 mm. Recurrence was noticed in 3 (7.8%) cases with a mean follow up of 20.7 \pm 7.3 months; one out of the 3 cases was small and resolved spontaneously.

Conclusion: The tadpole island flap is a versatile and effective single stage, two-layered fistula repair technique suitable for both, large and recurrent fistulae.

Keywords: Mucoperiosteal island flap, Palatal fistula, Tadpole flap.

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INTRODUCTION

Congenital cleft lip and palate account for 7.2% all congenital anomalies with a prevalence of 1 in 500 to 2500 live births^{1,2,3}. Most of the recent literature recommends repair of cleft palate between 6 months to 18 months for best possible speech development and midfacial growth⁴. Postoperative palatal fistula formation is a common complication, occurring in 6% to 42% of cases^{5,6}. Despite a large number of surgical techniques described, the history of surgical repair of palatal fistula seems to be a continuous revision of various themes with many milestone

innovations down the way but the ideal one is yet to be found. The frequency of fistula formation is dependent on experience of operating surgeon, type of cleft palate and age at palatal closure⁷. Various etiological factors have been attributed to fistula formation, including poor surgical technique, tension at the suture line, infection, ischemia of edge /flap and traumatic disruption of healing wound⁸. Although fistula can occur at any site along the repaired cleft palate but hard palate and junction of hard and soft palate are the most common sites⁹. Site and size of the fistula play a vital role in causing symptoms and its management. Based on location they are divided into anterior, mid-palatal, at junction of soft and hard palate and soft palate^{10,11} and based on its size¹², into small (<3mm), medium (3-4mm) and large (>5mm). Very small asymptomatic fistulas

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need not be repaired. Patients with palatal fistula commonly present with nasal regurgitation of fluid and food, hypernasality, mouth odour, hearing problems and psychological issues.

Repair of fistula can be a technical challenge even for an experienced cleft surgeon because of lack of availability of local tissue and scarring due to previous surgery. To overcome this problem, various innovative surgical techniques have been used over the last few decades; including mucoperiosteal flaps, free flaps, tongue flaps and buccal musculomucosal flaps, each having its own merits and demerits in terms of recurrence of palatal fistula¹³⁻¹⁵. Mucoperiosteal island flap repair is relatively easy to perform and, because of its good blood supply and mobility, has the ability to close even the large fistulae.

The purpose of this study was to evaluate the role tadpole island flap in selected cases of palatal fistula repair.

MATERIAL AND METHODS

This descriptive retrospective study was conducted at paediatric surgical department of Military Hospital Rawalpindi and Cleft Hospital Gujrat with retrospective data collection from November 2010 to September 2014. A total of 38 consecutive patients, 23 males and 15 females, with palatal fistulae following repair of congenital cleft palate were included. It also included cases of recurrent fistulae, i.e., those occurring after one or more previous attempts at fistula repair. Patients with asymptomatic fistulae, history of palate repair of less than 6 months duration and fistulae other than those developing after cleft palate repair were excluded from the study; these latter included congenital and infectious causes. Documentary record or intraoperative finding of damage to the greater palatine vascular pedicle also precluded this procedure.

All patients underwent thorough routine preoperative clinical assessment and laboratory investigations including complete blood counts, blood grouping and cross matching.

Echocardiograms to exclude congenital heart anomalies were ordered only if they had not been done previously. Informed and written consent was taken from parents.

The repair was performed in supine position under general anaesthesia with an intraoral RAE (Ring, Adair and Elwyn) tube. Head was supported in a head ring and neck fully extended by placing appropriately sized sand bag between the shoulder blades. After draping a Kilner or Dingman mouth gag was applied to provide adequate exposure of the palate and oral cavity. Throat was packed around the tube with ribbon gauze. Amoxicillin/clavulanic acid (100mg/kg) and metronidazole 7.5 mg/kg were given intravenously at the time of induction anaesthesia. Preoperative assessment of site, size, number of fistulae and the available mucoperiosteal tissue for flap, was made. Lidocaine 1% with 1:100,000 epinephrine was infiltrated around the fistula and into the ipsilateral or contralateral mucoperiosteal flap depending upon the degree of scarring (fig-1). Nasal layer was reconstructed with 5/0 polydioxanone after raising circumferential 4 to 5 mm rim of the local mucoperiosteal flap (Figure-2). A mucoperiosteal Veau's flap was raised along the previous scar lines up to the point of exit of the greater palatine artery from its foramen, clearing all soft tissue attachments and, at times, removing a small piece of bone from the edge of the foramen with a small osteotome, to get a few extra millimeters of mobility (Figure-3). The flap was divided completely just behind the entry of its vascular pedicle, making it a true tadpole shaped island flap (fig-4).

The flap was advanced to the site of the fistula and sutured in place using 5/0 polygalactin or polydioxanone suture, thus reconstituting the oral layer (fig-4).

Haemostasis was achieved with bipolar diathermy or adrenaline soaks. The defect so created, by advancement of island flap, was loosely packed with Surgicel.

All patients were monitored, postoperatively, in high dependency unit for the initial 24 hours and oral fluids were started on first postoperative day. Patients were discharged on 2nd postoperative day with oral antibiotics (amoxicillin/clavulanic acid and metronidazole) for one week and analgesic (ibuprofen) for two weeks. The parents were advised to give only liquid diet over the next two weeks, using a cup,

RESULTS

The outcome was considered successful if there was complete anatomical closure of the fistula.

A total of 38 patients, 23 (60.5%) males and 15 (39.5%) females, underwent surgery for palatal fistula repair. The mean age was 10.5 years ± 7.2 years (range 2 years to 33 years). There were 32 (84.2%) anterior and 6 (15.8%) at junction of soft



Figure-1: Large anterior palatal fistula.

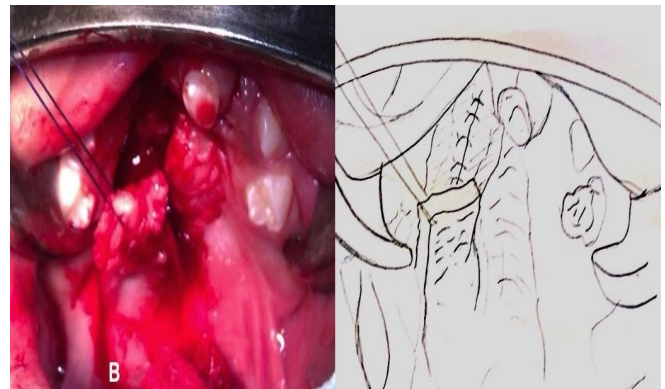


Figure-2: Closure of nasal layer using local flaps and start of island flap dissection

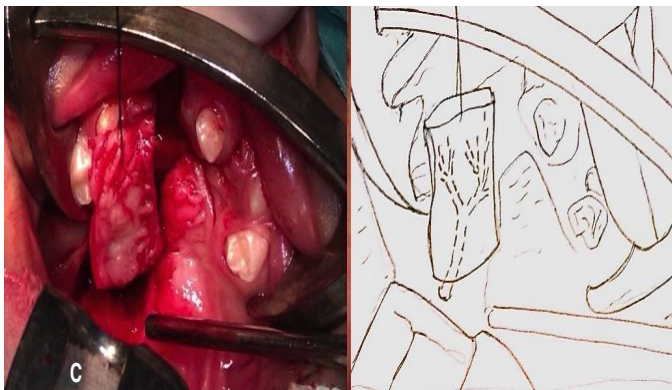


Figure-3: Elevation of mucoperiosteal island flap based on its vascular pedicle.

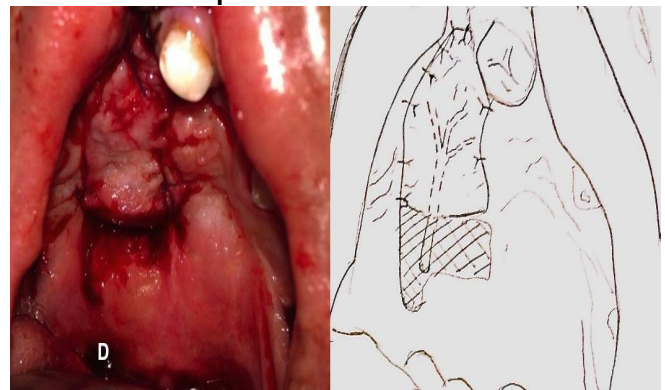


Figure-4: Mucoperiosteal Island flap closing the fistula as an oral (second) layer. The raw area (shaded) posterior to the flap is packed with Surgicel.

spoon or a syringe. Bottle-feeding was avoided. After two weeks feeding restrictions were discontinued. The patients were re-evaluated at two weeks, three months and then six monthly for the next 2 years and thereafter yearly with a advice to follow up till puberty .Data analysis was carried out by using SPSS version 17. Mean ±SD was calculated for qualitative variables where as categorical variables were presented by frequency and percentages.

and hard palate. Fourteen (36.84%) were recurrent fistulas, i.e. there had been one or more previous attempt to repair them. The mean fistula size was 8 mm ± 1.6 mm, ranging from 6 mm to 15 mm. Mean follow up was 20.7 ± 7.3 months with a minimum of 6 months to a maximum of 44 months duration. Recurrence was noticed in 3 (7.9%) cases, of which two occurred in recurrent fistulas and one in a fresh case. The last one was about 3mm in size, remained asymptomatic and

resolved almost completely after a follow up of 13 months.

DISCUSSION

Palatal tissue has always been the first choice for the repair of the smaller palatal fistulas while the different pedicle flaps are generally used for repair of large fistulas. Surgical techniques currently used for repair of palatal fistula can be broadly classified into hinge flaps¹⁶ e.g., local mucoperiosteal flap in one form or another and pedicle flaps e.g, buccal myomucosal flaps¹⁵ and tongue flaps¹⁴.

Management of palatal fistula needs multidisciplinary approach for optimum outcome. At present, there is no standardization of treatment for palatal fistula repair worldwide, moreover, surgical techniques being used lack satisfactory outcomes. Over the last few decades, a wide range of reconstructive techniques e.g. regional pedicle flaps or free flaps have been tried to repair the postoperative palatal fistulas. Most of these techniques are technically demanding, time consuming and cumbersome^{14,15}. Tadpole island flap follows the basic principle of reconstructive surgery, that is, to use the local tissue by simplest and safest technique. It provides well vascularised and a tension free two-layered closure of even the large fistulas.

In 1962, Millard, originally, introduced island flap for palatal lengthening, the main advantage of palatal flap is its simple anatomy¹⁷. The palatal mucosa is tightly adherent to its underlying periosteum which in turn is bound to hard palate by Sharpey's fibers¹⁸. Tadpole island flap is an axial flap, based on greater palatine artery, which has a great versatility and ability to rotate to 180 degrees¹⁹. Ashley, in 1962, was the first to describe the full thickness mucoperiosteal flap for closure of palatal fistula²⁰. The island flap (also called the "tadpole" flap, because an oval shaped flap with a "tail" of the vascular pedicle resembles a tadpole) can be used effectively to repair moderate to large fistulae.

In our study, there were 84.2% anterior and 15.8% fistulas at junction of soft and hard palate,

figures almost similar to those observed by Carstens²¹.

A mean age of 10.5 years is to be expected in a developing country, like Pakistan, with limited medical facilities, low literacy rate and majority of the population residing in backward rural areas. Abdaliet al²² from Iran also reported a mean age of 10.7 years; these figures are considerably higher than those mentioned in studies from developed countries. Moreover a large proportion of the cases (36.8%) were recurrent fistulae, after one or more failed previous attempts at repair so adding up more years to already late cases.

All the fistulae in this series were large fistulae (more than 5mm in diameter) with a mean size of 8 mm. Recurrence was observed in three cases, two had 13 mm and one had 15 mm size clearly indicating the role of size in recurrence of fistulas.

Recurrence rate of palatal fistula repair is about 37% and it becomes as high as 65% with subsequent attempts²⁰. In our study, closure of fistula was achieved in about 92% of cases with recurrence rate of 7.9% (3 cases) with a mean follow up of 20.7 months. One of them was a small asymptomatic fistula, which healed spontaneously over the next few months. The most probable cause of failure in these 3 cases was increased tension at the suture line and on the vascular pedicle. Watson²³ reported a success rate of 61.5% (i.e. a failure rate of 38.5%) with the same technique but he selected only the recurrent cases; whereas only 14.3% recurrence was noticed in recurrent fistulas in our study. Buccal myomucosal flap, a two-stage repair, used by Nakakita et al¹⁷ had a success rate of 69% and tongue flap performed by Jackson²⁴ was successful in 85% of cases. Both flaps involve two-stage repair with relatively high recurrence rate. While free flap repair, a complex and technically demanding undertaking with considerable morbidity, used by Schwabegger et al²⁵ had variable results.

CONCLUSION

The island (tadpole) flap of the palatal mucoperiosteum based on an intact and fully mobilised vascular pedicle is an effective and versatile technique for a single stage, two layered repair of palatal fistulae. It is suitable for fistula of almost any location and size. The surgeon, however, must be well conversant with other techniques in case of non-feasibility of flap on per-operative assessment. A significant limitation to the use of this technique is damage to the vascular pedicle during previous operations.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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