Recent Updates in Management of Palatal Fistula after Cleft Palate Repair

An essay

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Mohamed Medany Mohamed

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INTRODUCTION

Cleft palate is a condition in which the two plates of the skull that form the hard palate (roof of the mouth) are not completely joined. The soft palate is in these cases cleft as well ***(Kimet al., 2010)***.

In most cases, cleft lip is also present. Palate cleft can occur as complete (soft and hard palate, possibly including a gap in the jaw) or incomplete (a 'hole' in the roof of the mouth, usually as a cleft soft palate). The hole in the roof of the mouth caused by a cleft connects the mouth directly to the nasal cavity ***(Tollefsonet al., 2011)***.

The presence of a cleft palate introduces feeding difficulties, concerns regarding speech development, and the possibility of impaired facial growth ***(Hooper et al., 2007)***.

Both environmental teratogens and genetic factors are implicated in the genesis of cleft lip and palate. Teratogens, such as alcohol, anticonvulsants, and retinoic acid, are associated with malformation patterns that include cleft lip and palate ***(Hooper et al., 2007).***

Under normal conditions, the palate functions in concert with the pharyngeal musculature to close the velopharyngeal valve. Clefting of the palate results in an absence of velopharyngeal closure and the inability to build up and sustain intraoral pressure. This has significant effects on both early feeding and the development of normal speech. In addition, the abnormal muscle anatomy present in cleft palate has an indirect effect on the function of the middle ear through the resultant anatomic disturbance present along the eustachian tube orifice from which the primary palatal muscles originate ***(Bauer and Patel, 1999)***.

Cleft palate repair is usually performed at approximately 9 to 18 months of age. In deciding the timing of repair the surgeon must consider the delicate balance between facial growth restrictions after early surgery and speech development that requires an intact palate to produce certain speech sound by 18 months of age ***(Costello and Ruiz, 2004).***

Caring for the child with cleft palate require a multidisciplinary approach that begins with evaluation for other possible congenital anomalies, decisions about timing of repair, and choice of the techniques. Postoperative follow up similarly requires a team approach and should include an otolaryngologist, an orthodontist, and a speech therapist ***(Sadoveet al., 2004).***

The list of surgical techniques used in palatal cleft closure is extensive. The repairs differ depending upon whether the cleft is an isolated cleft palate or part of a unilateral or bilateral cleft lip and palate. The 3 main categories include (1) simple palatal closure, (2) palatal closure with palatal lengthening, and (3) either of the first two techniques with direct palatal muscle re-approximation ***(Chenet al., 2011)***.

Oronasal or palatal fistula is an abnormal communication between the oral cavity and nose, it is probably the commonest complication associated with cleft palate surgery. The rate of oronasal fistula varies from 4-35%, or even more in case of primary palatoplasty ***(Cohen et al., 1991)***.

The two main symptoms associated with oronasal fistula are nasal regurgitation and speech problems, mainly hyper-nasality. The site and size of the fistula are variable and so are the causes. Oronasal fistula

develops primarily because of repair under tension and in some cases, especially in adults, as a result of postoperative infection ***(Shelton, 1984)***.

Recurrence rate following palatal fistula closure have been reported as high as 16% to 65% in various series respectively ***(Schultz, 1991)***. Secondary repair of recurrent oronasal fistula is one of the most challenging and difficult problems ***(Ashtiani, 2005)***.

The primary cause of development of oronasal fistula is trauma and repair under tension. However, there are some palatal clefts which are quite wide and the available tissue to repair the palate seems inadequate. In these cases, the chance of development of oronasal fistula is higher though in experienced hands they can be prevented. The other reason is postoperative infection which is hardly seen in small children. Vascular accidents during palatoplasty can cause flap loss and is relatively an uncommon reason for development of oronasal fistula. Besides these, inadvertent use of diathermy, particularly near the greater palatine pedicle can compromise the blood supply of the mucoperiosteal flap and can result in an oronasal fistula***(Amaratunga, 1988)***.

According to the location, fistulas are described as anterior fistula, midpalatal fistula, fistula at the junction of the soft palate and hard palate and soft palate fistula ***(Diahet al., 2007)*** reported the hard-soft plalte junction as the commonest site (53.1%). Local flaps and two-flap palatoplasty were the most common techniques used to repair these oronasal fistulas. They also reported that 25% of these cases were reported for recurrence of the fistula ***(Amaratunga, 1988)***.

Timing of surgical closure of oronasal fistula is very important and it should be attempted at least six months after the previous surgery. One of the most important principles in closer of oronasal fistula is closing the fistula in tow layers. Both the layers should have well-vascularised tissue and the suturing should be free of tension. There are also reports in literature wherein closure of oronasal fistula was effected in three layers. As an intermediate layer, cartilage, bone and acellular dermal matrix have been used ***(Murrellet al., 2001)***.

AIM OF THE WORK

The aim of the work was to discuss the etiology, pathology and management including recent methods of surgical closer of palatal fistula after cleft palate repair.

HISTORICAL BACKGROUND

The only evidence of the cleft palate deformity to come down to us from the civilization of ancient Egypt is the skull showing a cleft palate. A similar skull dating from the first century A.D. has been discovered in Peru ***(Santoni and Sykes, 2007)***.

The first recorded operative treatment of a cleft patient has been attributed to the period of the chin (Tsin), the repair was of cleft lip only, and no mention of cleft palate repair was made ***(Hoffman and Mount, 2007)***.

Misconception after the middle Ages regarding the nature of the cleft palate probably meant that there was little interest in treating the deformity ***(Rogers, 1977)***.

Because the cleft palate was known to affect the palate and pharynx, with calamitous effects on the voice, patients with facial clefts were automatically relegated to this category of untouchables. As late as 1819 a Canadian medical student who became Roux's first cleft palate patient, underwent tests to exclude syphilis before his operation ***(Santoni and Sykes, 2007)***.

In 1556 Pierre Franco noted that normal speech required an intact palate and wrote what was probably the first description of a submucous cleft which he called a "cleft without a cleft". He had also observed that "cleft patients always talk through their noses ***(Santoni and Sykes, 2007)***.

Karl Kaspar Siebold (1736-1807) conducted detailed studies on the speech defects exhibited by a three-year old boy with a cleft soft palate, and noted that he had difficulty in pronouncing the letters B, R, S and Z.

Siebold expressed deep regret at the "impossibility" of correcting this defect surgically ***(Santoni and Sykes, 2007)***.

The French dentist LeMonnier performed the first surgical repair of a congenital cleft palate in the 1760s. The three-stage operation consisted of passing sutures through the cleft borders, cauterizing the cleft edges, and realigning the fresh edges. A report of the operation by an observer concluded, ''the child was perfectly cured" ***(Millard, 1980)***.

The first documented operation on the palate was carried out in 1816 by Carl Ferdinand von Graefe (1787-1816). This achievement was a genuine milestone for it marked the end of a period that had lasted for centuries during which technical difficulties, ignorance, superstition and fear, not to mention the spectre of syphilis, hampered progress in this area ***(Santoni and Sykes, 2007)***.

Almost three years later, in 1819 Philibert Joseph Roux (1780-1840) reported the details of a similar operation, he and many others sincerely believed that this was the first case to be described in the medical literature ***(Santoni and Sykes, 2007)***.

The first surgeon to successfully close a hard palate cleft was Dieffenbach in 1826. He mobilized the mucous membrane, and performed lateral relieving osteotomies in the two palatal bones ***(Santoni and Sykes, 2007)***.

In the United States Jonathan Mason Warren (1811-1867) modified the procedure by extending the bone incisions even further both anteriorly and posteriorly, occasionally as far as the pillars of the fauces ***(Santoni and Sykes, 2007)***.

Another fundamental breakthrough was made by von Langenbeck (1810-1887). He recognized the capacity of the periosteum to produce bone exploiting this in various reconstructions (nose 1850, and jaw 1859). He did not miss the opportunity to apply this to the repair of the palate, suggesting the inclusion of the periosteum of the palatal bones in the mucosal flaps ***(Santoni and Sykes, 2007)***.