Abstract

Purpose: We present a new fistulectomy method for the second pharyngeal arch remnants.

Materials and Methods: Between 1991 and 2003, 4 patients have been treated with a new fistulectomy method.

Surgical Procedure: Under general anesthesia with nasotracheal intubation, the neck and mouth are prepared as one operative field. A nylon thread is inserted into the cervical opening and passed via the fistula into the mouth. On the oral site of the nylon thread, a small gauze ball is tied and gently pulled from the neck site. At both opening sites of the fistula, a very small incision around the nylon thread is performed. Using the nylon thread as a guide, a fistulectomy is carried out.

Results: In all 4 patients, no complications have occurred during and after the fistulectomy. No recurrences were seen during 15 months to 9 years.

Conclusions: This is a simple and useful procedure for the treatment of second pharyngeal arch remnants. It produces an excellent cosmetic result compared with the standard method because only one small incision is necessary.

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1. Materials and methods

Between 1991 and 2003, 4 patients with a second pharyngeal arch fistula have been treated with this procedure. A diagnosis of pharyngeal arch fistula was made clinically and was confirmed with fistulograms using a radio-opaque solution (Fig. 1).

2. Surgical procedure

Under general anesthesia with nasotracheal intubation, the neck and mouth are prepared as one operative field. A 2-0, 3-0, or 4-0 nylon thread is then inserted into the cervical opening and passed via the fistula into the mouth.
If a direct insertion of the nylon thread through the fistula fails, a guide wire is effective (Fig. 2). On the oral site of the nylon thread, a small gauze ball is firmly tied and gently pulled from the neck site. The fistula usually is straightened and shortened to half of its length (Fig. 3). At the cervical opening sites of the fistula, a very small incision around the nylon thread is made. The first few millimeters of the cervical portion of the fistula are freed by blunt dissection. A 3-0 or 4-0 silk thread is transfixed to the dissected tract. Under the gentle traction of both nylon and silk threads, only the fistula tract is carefully dissected from the surrounding structures as high as possible from the neck site. At the oral site, a small mucosal incision around the nylon thread is made. The dissection of the parapharyngeal segment of the fistula, a few millimeters in length, is executed from the cervical and/or oral site using forceps or thin, long, blunt scissors. The fistula tract in its entirety is delivered through the mouth. The pharyngeal wound is closed by one or two interrupted absorbable sutures. The small neck wound is not sutured and is used for drainage for 1 or 2 days.

3. Results

The patients were 3 boys and 1 girl. Their ages were 8 months to 4 years. Lengths of the fistulas were 3 to 8.5 cm on fistulograms (Table 1). No major complications have occurred during and after the fistulectomy. Histological analysis showed a fistula tract with a muscular wall lined by benign squamous epithelia.

The fistula of the second case was incomplete. For the purpose of measurement of the length of the fistula, a thin lacrimal probe was inserted into the cervical opening and pushed inside. The tip of it projected on the surface of the pharynx. The distance between the tip of probe and the surface of the pharynx was less than 1 mm in thickness; therefore, this method was tried. A 22-G-long injection needle was used to penetrate from the end of the fistula to the pharynx, and then a nylon thread was inserted to the mouth. In the third and fourth cases, the fistula tract was interrupted during its dissection. At the cervical site of the nylon thread, a new small gauze ball, with an adequate size for the dissected tract, was firmly tied again, and using gentle traction, this thread was pulled to the oral site. The remaining part of the fistula tract was dissected and completely removed through the mouth with the nylon thread and small gauze ball.

The postoperative course was uneventful. No recurrences were seen during 15 months to 9 years.

4. Discussion

Pharyngeal arch fistulas and cysts involving soft tissues of the neck are uncommon anomalies of embryonic development [1]. Second arch anomalies are most common and may take several forms. A complete pharyngeal arch fistula with external and internal openings is rare [2]. The external opening of the second pharyngeal fistula lies along the anterior border of the sternocleidomastoid muscle, generally at the junction of its lower and middle thirds. Because of its embryologic origin, its tract penetrates platysma and cervical fascia to ascend along the carotid sheath to the level of the hyoid bone. It then turns medially between the branches of the carotid artery, behind the posterior belly of the digastric and stylohyoid muscle, and in front of the hypoglossal nerve to end in the palatine tonsillar fossa. Its completeness is diagnosed by a dye test in which methylene blue is injected through the cervical opening and appears in the throat or by a fistulogram, which can demonstrate the tract in its entirety [1].

In the past, attempts were made to treat the fistula by injecting sclerosing agents into it. The aim was to destroy the fistula with little scarring [3]. However, because of the intense reaction produced, there was a definite risk of damage to important nearby structures or pharyngeal perforation [3]. Today, the standard method of treatment is by total surgical excision of the fistula. Various surgical
techniques have been described in the approach to a pharyngeal fistula; nowadays, the standard surgical procedure is a stepladder incision originally described by Bailey [4] in 1933 and recommended by later authors. The fistula tract could be approached via a series of stepladder incisions, usually with the first encompassing the sinus opening and the second overlying the carotid bifurcation. The highest incision should be fairly large to facilitate dissection of the deep parapharyngeal segment of the fistula. It allows for adequate exposure of neck structures for accurate dissection and is able to be removed for complete resection of the fistula tract.

In 1992, Talaat described a pull-through branchial fistulectomy [5]. Alternatively, 1 or 2 small (stepped) incisions could be made in the cervical region for access to the infrahyoid portion of the fistula. Subsequently, the parapharyngeal portion of the fistula could be approached perorally after a tonsillectomy. The fistula, freed from surrounding structures, was then delivered through the mouth (pull-through technique). This technique obviated the necessity for big cervical incisions and thus was more cosmetic than the original stepladder technique.

Cox [6], in 1963, described a method using an arterial intimal stripper. He mobilized the lower end of the fistula with a small cervical incision, inserted it through the ring of the arterial stripper, and then pushed the stripper along the length of the outside of the tract as far as the pharyngeal opening. He was then able to avulse the tract completely from below. In 1977, another method using the stripper was described by Taylor and Bicknell [4]. In contrast with Cox’s procedure, the stripper passed into the fistula tract, and then stripping of the complete tract was performed. In 1991, Lee and Krishnan [7] described the use of this method. This technique was safer than that of Cox’s because the stripper was passed inside the fistula with ease rather than along the outside of the fistula where, because it was essentially a blind procedure, damage to important structures, particularly the great vessels, could occur. Cosmetically, these methods were better than the standard stepladder procedure because they left only minimal scarring. But, these methods were not widely practiced.

The method with nylon thread insertion into the fistula tract was originally devised by Azuma et al [8] in 1986. In their method, nylon thread was tied at the cervical opening of the tract. We modified their method as described above. When the nylon thread with small gauze ball was pulled to the neck site, the fistula tract usually straightened and as well shortened to half of its length. The thread was very helpful in handling the fistula during dissection. Our technique is safe, simple, and effective. It produced an excellent cosmetic result compared with the standard method because only one extremely small incision was necessary. If a direct insertion of nylon thread through the fistula fails, a guide wire is effective. Although the fistula of our second case was an incomplete type, the same method was also tried because the distance between the end of fistula and surface of pharynx was less than 1 mm in thickness. A 22-G-long injection needle was used to penetrate from the end of the fistula to the pharynx, and then a nylon thread was able to be inserted. On the third and fourth cases, the fistula tracts were interrupted during dissection. In both cases, at the cervical site of the nylon thread, a new small gauze ball was firmly tied. The remaining part of the fistula tract was dissected and completely removed easily through the mouth. This technique ensures a complete fistulectomy, and it is safer and more cosmetic than any other procedures described before. This technique may be also

<table>
<thead>
<tr>
<th>No.</th>
<th>Year</th>
<th>Sex</th>
<th>Age</th>
<th>Side</th>
<th>Type</th>
<th>Nylon thread</th>
<th>Length of fistula (cm)</th>
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<tr>
<td>1</td>
<td>1991</td>
<td>F</td>
<td>4 y 9 mo</td>
<td>R</td>
<td>Complete</td>
<td>2-0</td>
<td>8.5</td>
</tr>
<tr>
<td>2</td>
<td>1994</td>
<td>M</td>
<td>8 mo</td>
<td>L</td>
<td>Incomplete</td>
<td>2-0</td>
<td>3.0</td>
</tr>
<tr>
<td>3</td>
<td>2002</td>
<td>M</td>
<td>8 mo</td>
<td>R</td>
<td>Complete</td>
<td>3-0</td>
<td>6.0</td>
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<tr>
<td>4</td>
<td>2003</td>
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<td>11 mo</td>
<td>R</td>
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</table>
used for other types of fistulectomy such as piriform sinus fistula.

A new method for the removal of the second pharyngeal arch fistula is described. Using the nylon thread as a guide and traction on the gauze ball at one end of the fistula, a simple fistulectomy is easily possible with an extremely small incision. Any additional incisions at the neck site are not required.

References


