ABSTRACT

Purpose: To analyze the surgical results in 370 patients who underwent enucleation or evisceration at our center, during a period of 11 years (1990-2000), determining the kind of correction used and the complications associated with the procedure.

Methods: This was a retrospective study of medical records from all patients who underwent surgery by the same surgeon (FS) in the Oculoplastic Department. Demographic data, diagnosis, previous and associated ophthalmic surgeries, implant or graft characteristics, follow up period and postoperative complications were determined in all patients.

Results: One hundred sixty-one enucleations and 209 eviscerations were performed. Some kind of implant or graft was associated with 98.4% of these procedures. During the first 6 years of the study, lipodermal grafts were performed in 58.8% of the total, while in the last 5 years hydroxyapatite implants were performed in 90.9% of the cases. In 39 (10.6%) of 369 patients with registered follow up data, 58 complications requiring surgical correction were observed.

Conclusions: Hydroxyapatite implants gave an excellent anophthalmic socket reconstruction, and improved esthetic and motility results. Lipodermal grafts were an excellent alternative in our environment. We observed some complications with the

RESUMEN

Objetivo: Describir el análisis del resultado quirúrgico de las enucleaciones o evisceraciones realizadas en 370 pacientes en nuestro centro durante 11 años (1990-2000). Se estudió el tipo de corrección realizada y las complicaciones asociadas al procedimiento quirúrgico.

Métodos: Estudio retrospectivo de las historias clínicas de los pacientes que fueron sometidos a los procedimientos mencionados. El cirujano (FS) fue siempre el mismo. Se consideraron los datos demográficos, el diagnóstico, la cirugía ocular previa y asociada, las características de los implantes o injertos, el seguimiento y las complicaciones posteriores.

Resultados: Se realizaron 161 enucleaciones y 209 evisceraciones. El 98.4% de estos procedimientos se asoció a la colocación de algún tipo de implante o injerto. Durante los primeros 6 años del estudio se colocaron injertos lipodérmicos en el 58.8% de las operaciones realizadas. En los últimos 5 años, el implante de hidroxiapatita constituyó el 90.9% de los casos intervenidos. En 39 de los 369 pacientes (10.6%) se observaron 58 complicaciones, las cuales requirieron algún tipo de cirugía.

Conclusiones: Los implantes de hidroxiapatita consiguieron una excelente reconstrucción de la órbita anoftálmica, y mejoraron los resultados esté-
different techniques, but only a few required surgical correction (Arch Soc Esp Oftalmol 2007; 82: 495-500).

Key words: enucleation, evisceration, anophthalmic cavity, implants, hydroxyapatite, lipodermal graft.

INTRODUCTION

The enucleation of the eye globe was first described by Bartish in 1583 (1,2). The technique still in use was described by Farrell and Bonnet in 1885. That same year, Mules reported the use of the first orbital implant after evisceration (3). For more than one hundred years, the choice between enucleation or evisceration is still debated, and finally it is determined by the disease origin (4).

Several materials have been used to manufacture implants, while extraocular muscles may be fitted into only some of them (5). In the past few years, porous spheric implants (porous polyethylene and hydroxyapatite implants) are the most widely used (6), based on features such as: biocompatibility, integration, lower extrusion percentages and lower number of secondary infections (4,7-10).

Lipodermal graft is an option in those cases where no other implants are available or in the treatment of extruded implants. This graft requires an accurate surgical procedure and appropriate care after surgery (11-13).

SUBJECTS, MATERIAL AND METHODOLOGY

A retrospective review was undertaken including the clinical histories of 370 patients who underwent evisceration or enucleation in our center from January 1, 1990 to December 31, 2000. The procedures were performed by one of the surgeons from the Oculoplastics Department (FS). The review took into account the type of implants used and the associated complications. The statistical analysis was performed using Excel (Microsoft Corp, Seattle, WA, USA).

161 enucleations and 209 eviscerations were performed. The average age at the time of surgery was 31.2 years (range: 3 months to 86 years), while 47 patients (12.7%) were under 6 years old. Average follow-up was 36.9 months (range 15 days-13.9 years). 228 (61.6%) patients were male and 142 (38.4%) were female.

The most frequent reasons to perform this procedure were trauma, glaucoma and neoplasia (table I). 156 eyes (42.3%) suffered from phthisis bulbi or preptisis mainly caused by trauma, 77 eyes (53.2%), and surgical complications occurred in 22 cases (14.7%). Out of the 214 remaining patients, the most frequent reason for surgery was trauma sequelae in 105 eyes (28.5%), and tumors in 31 cases (8.4%). Choroidal melanoma, with 9 cases, and retinoblastoma, with 18 cases, were the most frequent cases in this category. Absolute glaucoma and buphthalmos were the cause in 26 cases (7%).

The type of implant used in this series (table II) included: lipodermal grafts in 126 (34.1%), nylon implants (Oertli) in 93 (25.2%) and hydroxyapatite implants in 142 (38.5%). The remaining 8 cases (2.2%) consisted of a combination of the former implants in 3 patients (due to the insufficient reconstruction volume achieved with the initial implant).

Table I. Indications

<table>
<thead>
<tr>
<th>Indication</th>
<th>No. of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>182</td>
<td>49.19</td>
</tr>
<tr>
<td>Glaucoma and buphthalmos</td>
<td>33</td>
<td>8.92</td>
</tr>
<tr>
<td>Tumors</td>
<td>31</td>
<td>8.38</td>
</tr>
<tr>
<td>Postsurgical complications</td>
<td>27</td>
<td>7.30</td>
</tr>
<tr>
<td>Microphthalmos</td>
<td>19</td>
<td>5.14</td>
</tr>
<tr>
<td>Other</td>
<td>78</td>
<td>21.08</td>
</tr>
</tbody>
</table>
strands in 2 patients suffering from an orbital infectious process, and none in 3 (due to orbital neoplastic infiltration). During the first six years of the study, lipodermal grafts corresponded to 58.8 percent of the techniques employed, whereas during the last five years, the hydroxyapatite implant made up 90.9 percent.

In 50 (94.3%) enucleations with hydroxyapatite implants, a scleral cover was used. Enucleations involving Oertli implants resorted to scleral covers only in 6 cases (10%). In the remaining cases, no cover was used.

The average implant size was 16 mm (range: 14-20 mm), whereas the placement of a stem was only prescribed in five patients upon the surgeon’s request.

Enucleation was performed by means of a conjunctiva and Tenon’s capsule 360° peritomy. The rectal muscles with strabismus hook were individualized dissecting the adjacent Tenon’s capsule and repairing those muscles with double-armed sutures. Insertions to the eye globe were sectioned. Subsequently, a section of the optic nerve was performed as deep as possible inside the orbit with enucleation scissors. When implants are porous, they are covered with a banked sclera and then closed with 5-0 polyester sutures in a U-pattern with intrascleral knots, subsequently opening four windows in the sclera in order to imbricate the rectal muscles inside those windows and facilitate the implant’s neovascularization. Tenon’s capsule and the conjunctiva are closed with sections with separated sutures in a «U» pattern (with Polyglactin 6-0).

During evisceration, a 360° peritomy, limbic sclerotomy and full keratectomy were performed with corneoscleral scissors. Uveal tissue was completely removed aided by spatula, a bung evisceration spoon and gauze plugs. The implant or lipodermal graft is placed inside the scleral skullcap. In the latter, relaxation cuts may be performed on the sclera in order to expand the continent.

The lipodermal graft was always extracted from the upper right gluteal region with a burr designed to this effect. The technique used for implantation in the orbital cavity is similar to the one described for other implants during evisceration or enucleation, although the resulting skin button is fixed in the first case to the scleral rim, and in the second case it is placed directly into the muscles.

Upon completion, a plastic shaper was placed in the conjunctival cavity, together with a pressure bandage.

Table II. Type of implant according to procedure

<table>
<thead>
<tr>
<th>Type of implant</th>
<th>Enucleation</th>
<th>Evisceration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydroxyapatite</td>
<td>53</td>
<td>90</td>
</tr>
<tr>
<td>Lipodermal graft</td>
<td>46</td>
<td>80</td>
</tr>
<tr>
<td>Oertli</td>
<td>59</td>
<td>34</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

After surgery, check-ups every three days were scheduled during the first two weeks. Later, patients were referred to the optician in order to fit the cosmetic ocular prosthesis. Based on the symmetry with respect to the contralateral eye and the eyelids contour, the examiner subjectively determined the implant motility and aesthetic appearance.

RESULTS

Check-ups after surgery were recorded during an average period of 36.9 months (ranging from 15 days to 13.9 years). Only one patient was exempted from these check-ups after surgery.

Some complications required surgical treatment for correction in 39 (10.6%) patients, 17 belonging to the group of patients undergoing enucleation and 22 for those undergoing evisceration (table III). The whole group was made up of 13 (33.3%) females and 26 (66.7%) males. Such complications emerged from 6 days to 10.3 years after surgery (mode: 2 weeks, average: 103 weeks). The age range went from 10 months to 79 years (average 29.6 years); out of those patients suffering from complications, 11 (28.2%) were under 6 years of age. The different implants resulted in complications that required surgical treatment in similar proportions (table IV).

In those cases involving lipodermal grafts, it is worth mentioning two complications not present in other types of implants in our series: one case of infected graft (solved by means of antibiotic medical treatment) and another where the gluteal wound reopened, thus requiring new sutures.

In total, there were 14 (3.8%) cases of implant or graft exposure (6 in subjects under 6 years), of which 12 underwent surgery, whereas 3 cases (.8%) suffered from implant extrusion. The average duration of exposure was 58 weeks (range: from 1 to 301 weeks) and 121 weeks (range: from 2 to 430 weeks) for extrusion (table V).
Patients were referred to the prosthodontist between the second and fourth week after surgery. Adequate motility and good cosmetic adaptation were observed in all patients.

**DISCUSSION**

The ideal orbital implant should bring along an adequate motility, good cosmetic outcome and few complications. Several authors (4,7,9,14) have suggested that a completely integrated implant in the orbit should minimize the probability of migration and extrusion. The hydroxyapatite microporous implant fulfills all these requirements and thus became the implant of choice (7). Other implants, such as Oertli's or the lipodermal graft, were also used to correct the anophthalmic cavity, especially during the first few years of the 1990s. It is worth noting that lipodermal grafts are still an excellent alternative as intraorbital implants, especially when the financial status of patients is a determining factor.

Most complications secondary to these surgical procedures can be solved adequately, as demonstrated by the present study. There were no significant differences regarding the complication rate between the different implants used. The complications in our series were less than those reported in world literature (15,16), and only a few cases required surgery to correct them. Several studies have reviewed the use of porous implants and their complications (8,17-23). The different exposure range for hydroxyapatite implants go from 0 to 22 percent (16,18,19,24-27).

A stem was placed in five hydroxyapatite implants. Such a small number does not allow for a significant statistical analysis with respect to this...
type of fitting. However, several complications have been described (25). The tendency is to avoid using them due to the damage caused to the implant by external ocular movements.

The final aesthetic appearance and motility of prostheses was deemed adequate by the surgeon in the 369 patients who underwent follow-up, just as reported in the literature available (7,24).

The age of patients may have some impact, since we observed a clear tendency to graft exposure or extrusion in children (23). One of our hypotheses is that rubbing, more difficult to control in children than in normal adult patients, may explain this result.

Today, several techniques to address the anophthalmic cavity aim at finding the right balance between a good result for the implant-prosthesis compound and a smaller number of complications. Nevertheless, only long-term studies will allow choosing the best option for patients.

REFERENCES


ARCH SOC ESP OFTALMOL 2007; 82: 495-500