Extended vertical transatrial septal approach for the removal of left atrial myxoma

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Abstract

Objective: Optimal exposure greatly facilitates left atrial myxomectomy and is mandatory for safe and efficacious tumour removal. The purpose of this study was to evaluate one institution's experience, with an alternative to the classical approach, for the removal of left atrial myxoma. Methods: In an eight-year period, eight patients underwent surgical removal of left atrial myxoma at our institution using the extended vertical transatrial septal approach, slightly modified compared to the original method of Guiraudon and associates, as the septum was initially incised superiorly instead of through the fossa ovalis. Results: One patient with poor left ventricular function died shortly after the surgical procedure because of low cardiac output. Postoperative course of the other patients was uneventful. No rethoracotomy for bleeding was carried out and no permanent arrhythmias were seen. There was one late death at 4.5 months after operation, for which no clear reason was found. Mean follow-up was 55 months (range 1 to 79 months) and revealed six asymptomatic healthy patients. Conclusions: We feel that the extended vertical transatrial septal approach provides good exposure of left atrial tumours and facilitates complete surgical removal without inherent complications such as tumour cell dissemination or fragmentation. © 1998 Elsevier Science B.V.

Keywords: Left atrial myxoma; Extended vertical transatrial septal approach; Surgical excision

1. Introduction

Primary heart tumours are rare, with an estimated incidence of 0.0017–0.19% at autopsy [1], the majority being benign. Approximately half the benign cardiac tumours are myxomas, occurring more frequently in the middle-aged and female population. Myxomas have their site of predilection mainly in the left atrium (80–90%) and less commonly in the right atrium [2]. In the left atrium, most myxomas arise from the interatrial septum near the fossa ovalis [1]. Besides relieving the patient of his or her complaints, therapy is indicated because of the risk of endocarditis [3], embolic complications [1] or sudden death [4].

The preferable treatment for myxomas is complete surgical removal, with total excision of the root of the pedicle, to avoid recurrence. Different pitfalls during the surgical procedure, like fragmentation and intraoperative embolization of the tumour and possible overlooking of a multicentric lesion, mainly due to inadequate visualization, have urged us to search for a more appropriate approach. Therefore, we used a modification of the original extended vertical transatrial septal approach, described previously by Guiraudon and associates [5]. We would like to present our experience over the last 8 years concerning eight patients admitted for surgical removal of left atrial myxoma using this technique.
2. Patients and methods

2.1. Patient data

Between January 1989 and January 1997, 21 consecutive patients were operated on for left atrial myxoma at the St Antonius Hospital, Nieuwegein, The Netherlands. Eight of these patients (three men and five women) were operated on using the extended vertical transatrial septal approach. The mean patient age at operation was 56.3 years, ranging from 47 to 70 years. Presenting symptoms were exertional dyspnoea, orthopnoea, generalized malaise, chest pain, palpitations, syncope, acute pulmonary oedema, transient ischaemic attacks, cerebrovascular accident and constitutional manifestations. All patients were in sinus rhythm. Mitral valve incompetence was present in two patients.

Transthoracic and/or transoesophageal echocardiography confirmed the diagnosis in all patients. Additional diagnostic procedures were used in some patients and included computed tomography and magnetic resonance imaging. Three patients underwent cardiac catheterization and subsequent coronary angiography to exclude associated coronary artery disease.

2.2. Operation

All patients underwent median sternotomy. Cardiopulmonary bypass (CPB) was established through cannuлас into the ascending aorta and both caval veins. Blood temperature was lowered from 20 to 32°C nasopharyngeally, depending on the surgeons preference. Cold crystalloid cardioplegic solution (Fresenius AG, Bad Homburg v/d H., Germany) was in every case delivered anterogradely through the aortic root. Additionally, topical saline cooling was used. After cardiac arrest, a longitudinal incision was made in the right atrium between the two venous cannuлас, ∼1 cm away from the atrioventricular groove (Fig. 1A). At this point, a modification to Guiraudon and associates [5] approach was added, as originally the septal incision commences through the fossa ovalis and extends all the way up, while we incised the left atrial roof first and then continued the incision in a caudal direction through the point where the left and right atria meet (Fig. 1 B, C). Exposure was considered to be excellent in all patients. Basal insertion of the myxoma was the interatrial septum in six patients, the left atrial free wall in one and the atrial side of the posterior mitral valve leaflet in another patient. All tumours were removed en bloc with a full-thickness excision at the site of attachment. No traumatic lesion of the myxoma or signs of embolization were noted and no excisional margins showed evidence of tumour on histological examination. All interatrial septal defects created were closed primarily, except in two patients in which an autologous pericardial patch was used fixed with 5-0 poly-propylene sutures. Subsequently, the right atriotomy was closed. Three patients had concomitant procedures done. In one, Kay tricuspid annuloplasty [6] was carried out and in two patients coronary artery bypass grafting was performed.

Average total perfusion time was 67 min (S.D. = 20.7 min), with an average total aortic crossclamp time of 51 min (S.D. = 27.5 min), with a range of 19–105 min.

3. Results

One patient with poor left ventricular function died just after the surgical procedure (myomectomy and multiple coronary artery bypass grafting) due to low cardiac output. The postoperative course of all the other patients was uneventful. Mean 12 h blood leakage through chest tubes was 268 ml. None of the patients had a rethoracotomy done for tamponade or excessive blood-loss. All patients were extubated from ventilatory support within 12 h after operation. One patient had transient atrial fibrillation postoperatively, while the others remained in a stable sinus rhythm. None of the patients required a permanent pacemaker and none had a residual atrial shunt at postoperative echocardiography. None of the resected myxomas recurred during follow-up.

There was one late death, 4.5 months after the operation. This 67 year old male patient died while sleeping. However, no clear reason for this fatal event was found, as no autopsy was performed. Further, late outcome analysis revealed six healthy patients without complaints and in sinus rhythm at a mean follow-up of 55 months (range 1–79 months).

4. Discussion

In 1955, Clarence Crafoord reported the first successful excision of a left atrial myxoma, using temporary cardiopulmonary bypass [7]. In the last three decades, several reports followed in which different approaches were described to achieve adequate exposure of left atrial structures, based on procedures which had been designed to reach the mitral valve in an adequate manner. Since the description of the ‘extended vertical transatrial septal approach to the mitral valve’ by Guiraudon and colleagues [5], this approach has become widely used and represents in many centres the principal approach for the majority of mitral disorders. Their technique includes the incision of the right atrium anteriorly along the atrioventricular sulcus. Subsequently, the atrial septum is opened vertically through the fossa ovalis. Both incisions are then joined at the superior end of the interatrial septum and are extended.
into the left atrial roof transversely. Basically the same
technique has been described by other authors [8,9],
who named the procedure ‘septal-superior (or trans-
plant) approach’ and ‘extended transseptal approach’,
respectively.

In 1993, Luisi and Caparrotti were the first to report
the use of the extended vertical transatrial septal ap-
proach for the removal of left atrial myxoma [10].
Guiraudon replied that he had used this approach in
two patients with left atrial myxoma and in 1995,
Viganò added another four patients [11]. To our knowl-
edge, no reports on this issue have appeared hereafter.

To date, left atrial structures have usually been ap-
proached by other surgical incisions. They include di-
rect ways to enter the left atrium through, e.g. a
superior left atriotomy [12], or indirectly via right atrio-
tomy and subsequently, a transseptal incision [13,14].
A biastral approach has also been favoured by various
authors and currently appears to be the most frequently
used approach to left atrial myxomas [15,16]. In our
series of 21 myxoma resections, we have also used the
biastral approach in the other thirteen cases, not de-
scribed in detail here. However, we have found the
extended vertical transatrial septal approach more con-

Fig. 1. Schematic operative view of atrial incisions. A. The right atrium is longitudinally incised parallel to the right atrioventricular groove. B. The right atriotomy is spread and the left atrial roof is incised. C. Final exposure to both left and right atrium. Ao, aorta; LA, left atrium; PA, pulmonary artery; RA, right atrium; RV, right ventricle; SVC, superior vena cava; IVC, inferior vena cava; SPV, superior pulmonary vein; IPV, inferior pulmonary vein; FO, fossa ovalis; CS, coronary sinus; TV, tricuspid valve.
venient because of better exposure due to direct simultaneous visualization of the right atrial septum and the site of insertion of the myxoma on the left side. No additional left atriotomy to localize the myxoma was necessary. The root of the pedicle could be excised with great ease and safety with minimal manipulation of the fragile tumour and therefore, diminished risk of tumour cell dissemination. The entry created provided enough space to take out even large tumours (as the largest mass measured $4 \times 5$ cm) and to inspect carefully all heart chambers for possible tumour fragments or further myxomas.

In conclusion, we believe that the extended vertical transatrial septal approach provides excellent exposure and represents a superior surgical option for the removal of left atrial myxomas with minimal risk of inherent complications. Intraoperative traumatic injury to the myxoma, which is mostly attached near the fossa ovalis, can be avoided by starting the septal incision superiorly.

References