Simultaneous percutaneous atrial septal defect closure and percutaneous coronary intervention

Perkütan koroner girişim ve atriyal septal defektin perkütan yaklaşımla eşzamanlı kapatılması

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ABSTRACT

Objective: To evaluate the possibility to perform both percutaneous coronary interventions (PCI) and atrial septal defect (ASD) transcatheter treatment during the same session. Transcatheter ASD closure is a well-established alternative to surgery and the treatment of choice for single vessel coronary artery disease (CAD) is accepted to be PCI.

Methods: From January 2000 to December 2005, 985 patients were referred to our center for ASD closure. One hundred thirty four patients (59 males, mean age 58 ± 4 years, range 45-72 years) were included in a prospective protocol of ASD transcatheter closure and coronary angiography.

Results: In 7 patients we found a coronary artery disease. A combined single setting definitive percutaneous approach (ASD closure and PCI) was performed in 6 patients. The patient number 4 was judged unsuitable for PCI and then was referred for surgery. There was no acute intra-procedural complication in all patients; renal functions pre and post procedure showed no change despite the increase in the amount of contrast used.

Conclusion: Our report showed the feasibility of both PCI and ASD transcatheter treatment during the same session. *(Anadolu Kardiyol Derg 2007; 7: 51-3)*

Key words: Atrial septal defect, transcatheter approach, Amplatzer septal occluder, coronary stents

ÖZET

Amaç: Çalışmamızın amacı eşzamanlı perkütan koroner girişim (PCI) ve atriyal septal defekt (ASD) tedavisinin uygulanabilirliğini değerlendirmektir. Atriyal septal defekt'in transkateter yöntemi ile kapatılmasının cerrahi yönteme karşı iyi bir alternatif olduğu iyi bilinmektedir ve PCI'nın tek damar koroner arter hastalığının (KAH) ilk tedavi seçeneği olduğu kabul edilmektedir.

Yöntemler: Ocak 2000 ve Aralık 2005 arasında kliniğimize ASD kapatılması için toplam 985 hasta sevk edilmiştir. Bunlardan 134 (59 erkek, ortalama yaş 58 ± 4 yıl, dağılım 45-72 yaş) hasta ASD kapatılması ve koroner anjiyografi prospektif protokolüne dahil edilmiştir.

Bulgular: Yedi hastada KAH tespit edildi. Kombine tek seansta tam perkütan yaklaşım (ASD kapatılması ve PCI) 6 hastada uygulandı. Bir hasta (4.) PCI için uygun bulunmadı ve cerrahi girişim için sevk edildi. Hiçbir hastada prosedür sırasında akut komplikasyon gelişmedi; kontrast miktarının artmasına rağmen prosedür öncesi ve sonrası renal fonksiyonlar değişmedi.

Sonuç: Çalışmamız eşzamanlı olarak her iki tedavinin PCI ve ASD'nin kapatılması şeklinde yapılabilir olduğunu göstermiştir. *(Anadolu Kardiyol Derg 2007; 7: 51-3)*

Anahtar kelimeler: Atriyal septal defect, transkateter yaklaşım, Amplatzer septal oklüder, koroner stentler

Introduction

The association of coronary artery disease (CAD) and atrial septal defect (ASD) in elderly patients, although uncommon, has been established (1).Transcatheter ASD closure is a well-established alternative to surgery (2-3). The combined surgical management of both diseases has been previously reported (4). The treatment of choice for single vessel CAD is widely accepted to be percutaneous coronary interventions (PCI). We report on our experience of the combination of ASD and CAD transcatheter treatment.

Methods

From January 2000 to December 2005, 985 patients were referred to our center for ASD closure. One hundred thirty four patients (59 males, mean age 58 ± 4 years, range 45-72 years) were included in a prospective protocol of ASD transcatheter closure and coronary angiograms. The coronary angiographic study was performed because of the potential risk of emergency surgery related to the ASD transcatheter closure (3).

The inclusion criterion for coronary angiography was the evi-

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dence of 3 or more risk factors: male over 40th, dyslipidemia, hypertension, smoking, diabetes. Two patients presented with stable angina.

The Quantitative Coronary Analysis (QCA) was used to quantify the significance of the coronary lesion. A value of QCA more than 70 was judged significant. All patients underwent assessment of the Coronary Reserve Flow (CRF) (0.014-inch FlowWire, JOMED/Cardiometrics) after injection of progressive doses of Adenosine (from 36 micrograms up to 84 micrograms). The test was judged significant for CRF <2.

The patients found to have a significant CAD, if eligible for percutaneous intervention, underwent closure of the ASD followed by PCI to the affected vessels.

In 5 out of 6 patients, the 0.014" guide wire of the CRF assessment was used for the PCI; the other 2 patients had a Balance Middle Weighted (BMW) guide wire inserted.

All patients had a baseline normal creatinine.

We obtained an informed written consent for all the patients.

ASD transcatheter closure technique

In all patients, implantation of an Amplatzer Septal Occluder (AGA Medical, Golden Valley, Minnesota, USA) was carried out under general anesthesia. Before starting the catheterization, transesophageal echocardiographic examination was undertaken, using a multiplane probe. Standard catheterization of the right heart was then performed through the right femoral vein, taking recordings of pressures and blood samples to calculate Qp/Qs ratio. Angiographic visualization of the defects was achieved by injection of contrast material in the left atrium or the right upper pulmonary vein in the left anterior oblique view with cranial angulation. Heparin (100 UI/Kg) and antibiotic prophylaxis were given routinely. Meditech or Numed balloons were used to establish the stretched diameter of the defect. Implantation was performed under fluoroscopic and echocardiographic control. After positioning a long sheath in the left atrium, the device was attached to its delivery wire and advanced within the sheath until the distal disc was deployed in the left atrial cavity. Both the sheath and delivery system were then slowly withdrawn towards the atrial septum. The proper position of the distal disc is confirmed on transesophageal echocardiography and then the proximal disc was opened on the right side of atrial septum by withdrawing the sheath. Interference of the device with the cava or pulmonary veins or with the atrioventricular valves was checked echocardiographically once deployment was complete. If all findings were satisfactory, the device was released.

PTCA technique

In all patients percutaneous transcatheter coronary angioplasty (PTCA) was performed following ASD closure (See corresponding video/movie image at www.anakarder.com). An activated clotting time (ACT) over 200 sec was aimed for. A 6 F guiding catheter was used for all patients from a trans-femoral approach. Passing of the lesion was achieved by a BMW 0.014 wire. Direct stenting was performed in all patients because the stenosis was anatomically suitable for direct implantation of stent without any pre dilatation and post dilatation done only in the third patient. The second patient had a distal lesion treated with simple balloon angioplasty (Table 1). For all patients we had informed consent.

Follow-up

All patients underwent clinical examinations, electrocardiography, chest X-ray and transthoracic echocardiography pre-discharge and at 1st, 6th and 12th months of follow-up for ASD closure. During the 6 months evaluation they underwent a stress test that showed no signs of myocardial ischemia.

Table 1. Patients summary

Pt.	Age, years	Device type	ASD size, mm	Device size, mm	Coronary lesion	% stenosis	Vessel size ,mm	Stent type	Procedural time, min	Fluoroscopy time, min	Contrast volume, ml
1	45	Amplatzer	22	24	LAD prox.	70	3	Jomed Flex Master 3.0 x 13	90	18	300
2	51	Amplatzer	26	28	Circ mid Circ distal	95 70	2.5 2	Jomed Flex Master 2.5 x 16	120	21	360
3	62	Amplatzer	19	20	RCA distal	90	2.5	Biotronic Lecton 2.5 x 20	75	15	250
4	58	-	20	-	LAD prox. Circ prox.	80 75	3.5 3	-			
5	65	Amplatzer	21	22	LAD prox.	85	2.9	Jomed Flex Master 3.0x13	96	24	242
6	69	Amplatzer	25	26	RCA distal	88	2.6	Biotronic Lecton 2.5x20	78	22	200
7	72	Amplatzer	15	16	Prox. LAD Diag. 1	70% 95%	3.5 2.5	Cypher stent 3.5x18	74	31	194

ASD- atrial septal defect, Circ- left circumflex artery, Diag.- diagonal artery, LAD- left anterior descending artery, prox.- proximal, pt.- patient, RCA- right coronary artery

Results

In 7 patients we found a coronary artery disease (Table 1); a combined single setting definitive percutaneous approach (ASD closure and PCI) was performed in 6 patients. The patient number 4 was judged unsuitable for PCI and then was referred for surgery; he had significant stenosis of proximal left anterior descending (LAD) artery and proximal circumflex artery. The surgeon treated both ASD and CAD simultaneously. There was no acute intra-procedural complication in all patients; renal functions pre and post procedure showed no change despite the increase in the amount of contrast used (Table 1).

Discussion

The sequence of the single setting procedure (coronary angiogram-ASD closure-PCI) was done taking in mind that surgical conversion after rare failure ASD closure may be indicated. Our report underlines the feasibility and the benefit of this combined approach: PCI and ASD transcatheter treatment during the same session.

Onorato et al. (5), reported previously the sequential treatment of this defects. We believe that there are no contraindications to perform both simultaneously if a clear indication exists; the procedure time and fluoroscopy time is not much longer than that of a normal ASD closure (2). The advantages for the patient are obvious; a single 48-hour hospital admission with less discomfort and less risk than the surgical closure.

This combined closure is only advisable in selected patients in which PCI is indicated. One of our patients was referred to the cardiac surgeons because of a left main equivalent disease [significant stenosis of proximal LAD and proximal left circumflex artery]; although the patient was asymptomatic the combined percutaneous procedure was aborted and coronary artery bypass grafting and surgical ASD closure were performed.

Our preliminary results show no complications and suggest that selected patients may benefit from the combination of both PCI and ASD transcatheter closure.

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