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PERCUTANEOUS OCCLUSION OF COMPLEX SECUNDUM ATRIAL SEPTAL DEFECTS

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Percutaneous closure (PC) of secundum atrial septal defects (ASD) has been performed safely and effectively. We report our experience with this procedure in patients (pts) with complex defects. From 9/97, 110 pts underwent ASD closure under general anesthesia and transesophageal echocardiographic guidance. Thirty pts (median age: 26 yrs) had complex anatomy defined as large defects (stretched diameter (SD) > 26mm) associated with 1 deficient rim (<4mm) or aneurysm of the atrial septum (20), and multiple defects or fenestrated septum (10). The median SD diameter was 27mm. Amplatzer devices were used in all but 1 pt. Two pts required 2 devices due to distant holes. The remaining with multiple/fenestrated defects received a single device. Modifications in the standard technique were required in some pts. Failures occurred in 3 pts with no anterior rim and a floppy postero-inferior rim. In 1 pt, a 30mm Amplatzer protruded towards the right atrium, was snared out of the body and exchanged for a 32 device. Mean procedure time was 100 minutes. Residual leaks were observed in 10/27 pts immediately after implantation. There was no major complication and all pts, except 1, were discharged the following day. In a mean follow-up of 12 mos, 2/27 pts (both asymptomatic) remained with residual leaks <4mm despite normal right ventricular dimensions. Despite being technically demanding, PC of complex ASDs can be performed safely and effectively. Pts with large defects associated with no anterior rim and a floppy postero-inferior rim were considered to have unsuitable anatomy for PC.

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OCLUSION PERCUTANEA DE LA COMUNICACION INTERAURICULAR (CIA). TIPO OSTIUM SECUNDUM

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El cierre quirúrgico de CIA tiene baja incidencia de morbilidad y mortalidad, aunque la toracotomía, pericardiotomía e isquemia miocárdica son factores de riesgo. El cierre percutáneo es una alternativa, porque reduce los riesgos inherentes a la cirugía.
OBJETIVO Evaluar los resultados con dispositivo Amplatzer (DAm) de niquel/titanio en el cierre de CIA en 45 pacientes (diciembre 2001/febrero 2003).
METODO A 45 pacientes (edad 18+/-17 años y peso 39+/-20 Kg) se realizó cierre de CIA. A 8 bajo sedación y a 37 bajo anestesia general con intubación.
RESULTADOS La técnica fue eficaz en 42 (93%). En 3 falló. En uno el DAm migró hacia aurícula izquierda y requirió cirugía. En el segundo no fue posible colocarlo por interrupción de vena cava inferior. En el 3º no fue posible a pesar de múltiples intentos El Qp/Qs pre-oclusión fue de 2.3+/-0.8. El diámetro de la CIA por ecocardiograma transesofágico de 23+/-8 mm y con catéter de medición 27+/-6. El diámetro del DAm 28+/-8 mm.
En 39/42 pacientes (93%), el ecocardiograma 1 día después del procedimiento no demostró cortocircuito residual. En 2 el cortocircuito despareció a los 3 meses y en uno persiste luego de 1 año.
De 45/44 pacientes fueron dados de alta 24 horas después del cierre, una a las 72 horas por dolor precordial.
CONCLUSIONES El DAm es seguro con alto porcentaje de oclusión completa y bajo porcentaje de complicaciones.
El cierre percutáneo de CIA se puede realizar tanto en niños (>3 años) como en adultos
Estudios a largo plazo son necesarios para identificar posibles efectos del DAm sobre la función ventricular.

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PERCUTANEOUS CLOSURE OF PERIMEMBRANOUS VENTRICULAR SEPTAL DEFECTS (PMVSD) WITH THE AMPLATZER DEVICE.

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Percutaneous closure of PMVSD has been performed with the new Amplatzer membranous septal occluder. We report further experience with this device with emphasis on morphological aspects of the VSDs and technical issues. Ten patients (pts) (median age and weight: 14 yrs and 34.5 kgs, respectively) underwent closure under general anesthesia and transesophageal guidance (TEE). The PMVSD diameter was 7.1±4.0 mm by angiography and 7.8±3.7 mm by TEE. Three pts had a true aneurysm of the membranous septum (2 with multiple exit holes), 4 had defects shrouded by lots of adjacent tricuspid valve tissue, 2 had subaortic defects with no tricuspid valve involvement and one had a right aortic cusp prolapse with trivial aortic regurgitation. Implantation was successful in all pts, although in 2 the initial device had to be changed for a larger one. Kinkings in the delivery sheath, inability to position the sheath near the left ventricular apex and device prolapse through the VSD prompted modifications in the standard technique. Device orientation was excellent, except in 1 case. Nine pts had complete occlusion within 1-3 mos (90%), with a tiny (1 mm) residual shunt in 1. Device-related aortic or tricuspid insufficiency, arrhythmias, and embolization were not observed. Two pts had slight gradients across the left ventricular outflow tract, normalizing after 3 mos. The Amplatzer membranous septal occluder was suitable to close a wide range of PMVSD sizes and morphologies with good short-term outcomes. Longer follow-up is required.

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OVERALL EXPERIENCE WITH STENTS FOR COARCTATION OF THE AORTA (COA)

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Stents (sts) have been used for CoA. We report our experience with the procedure. Since 09/97, 32 patients (pt) (21.4±11.4 yrs) underwent stenting for native (27), recurrent (4) or post PDA ligation (1) CoA. Associated lesions: nonsignificant VSD (1); prosthetic aortic valve with aneurismal aorta (2); PDA (1); aortic stenosis (2), post transplant (1). Thirty-four sts were used: Regular CP (16); covered CP (7); Palmaz (9); Genesis (1) and covered self expandable Braile (1). The BIB balloon was used with a diameter = the size of the isthmus. In 1 pt (PDA ligation) the st did not expand. In 2 pts, there was distal st migration (1 with acute aneurysm (aneu) formation). This was followed by a 2nd st placement, with the aneu treated by a Braile st. The CoA gradient was reduced from 45±15 to 5±7 mmHg and the CoA diameter was increased from 3.7±5.5 to 16.5±4.9 mm. There was no major complication. In a follow-up of 20±12 mos, mean arterial BP was 125±15/80±10 mmHg and lower pulses were normal. In all pts, antihypertensives were discontinued or reduced. Sixteen pts underwent control studies. Two had small aneu. Fractures were noted on 2/10 re-studied CP st cases. There was no late st migration or recoartation. In 1 pt, the st was successfully redilated as part of a staged protocol. Stenting native or recurrent CoA is safe and effective in selected pts, with good mid-term outcomes. It provides excellent immediate stenosis relief with no loss at follow-up. Control imaging is justified due to aortic wall abnormalities and st fracture. Late st redilation is feasible and effective.

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FECHAMENTO PERCUTÂNEO DO FORAME OVAL

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Objetivos: apresentar a experiência com o fechamento percutâneo de forame oval patente (FOP) e propor este método como alternativa ao tratamento medicamentoso e cirúrgico tradicionais, nos casos de acidente vascular encefálico isquêmico (AVEi) criptogênico .
Casuística: Foram submetidos a fechamento percutâneo de FOP doze pacientes (6M:6F). A idade variou de 6 a 68 anos. 10 apresentaram eventos neurológicos prévios..
Métodos: Injeção seletiva no FO é feita para análise morfológica. Efetuamos teste de microbolhas ao TEE para avaliar shunt direita–esquerda, espontaneamente ou induzido por manobra de Valsalva.O controle é feito através de eco transtorácico e TEE.
Resultados: O implante foi possível em todos os casos, sem complicações . Implantamos próteses de Amplatz em três casos e próteses Helex em nove. No primeiro caso (VLFS) utilizamos uma prótese de Amplatz de 25mm, permanecendo pequeno shunt residual. Ela foi facilmente substituída por uma de 35mm com bom resultado. Em outro caso (LGP) ficou mínimo shunt residual após utilização de prótese Helex 35mm. Todos os demais foram bem sucedidos. O follow-up não mostrou recorrência de eventos embólicos em nenhum paciente.
Conclusões: Concluímos que o fechamento percutâneo do FO é eficaz, dispensando os inconvenientes de anticoagulação a longo prazo. Achamos ser excelente alternativa à terapia farmacológica convencional, substituindo com vantagens a correção cirúrgica.
Embora os dois tipos de prótese utilizadas tenham sido eficazes, mais estudos são necessários para orientar a opção definitiva, por uma ou outra.

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USE OF COVERED CP STENTS FOR COARCTATION OF THE AORTA (COA)

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Covered stents (sts) have been used for patients (pts) with CoA. We report our experience with this procedure. From 12/01, 6 pts (17±12 yrs) underwent covered CP st implantation through 13-14 Fr sheaths. Conditions: CoA associated with anatomic or functional atresia of the aortic lumen; degenerative changes in the aortic wall; tight lesions (< 2mm) and a PDA. The BIB balloon was used in 5 cases with a diameter = the size of the isthmus. The length of the st was 6 mm in 1 pt to cover a long lesion and 39mm in the remaining. Aortic lumen atresia was crossed using the soft or stiff end of a coronary wire. Predilation was used in 4 pts. All sts were implanted successfully. The CoA gradient was reduced from 40.3±10.5 to 7.0±7.5 mmHg and the CoA diameter was increased from 1.2±1.5 to 14.5±3.0 mm. In 1 pt, a staged approach was undertaken due to significant hypoplasia of the isthmus resulting in an expected residual gradient. The PDA was closed immediately after st implantation. There was no major complication. All, except 1 pt, were discharged the following day. In a mean follow-up of 12±8 mos, mean arterial BP was 135±10/90±10 mmHg and lower pulses were normal. In all pts, antihypertensive drugs were discontinued or reduced. Two pts underwent control angiograms after 4 and 13 mos. There was no late st migration or recoartation. In 1 pt with an ascending aorta aneurysm, there was slight buldging of the aortic wall. Covered st implantation is safe and useful for selected pts with CoA. Aortic wall abnormalities may still occur in pts with degenerative changes in the aorta.

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PERCUTANEOUS VALVAR PERFORATION IN PULMONARY ATRESIA AND INTACT VENTRICULAR SEPTUM.

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Percutaneous valvar perforation (PVP) has been used in patients (pts) with pulmonary atresia and intact ventricular septum (PIVS). We report our experience with this procedure (proc). From 09/95, 16 pts (15 neonates) underwent PVP. The Osypka radiofrequency (RF) system and mechanical perforation with a coronary wire were employed in 2 pts each while the BMC RF system in the remaining. All pts had tripartite right ventricles (RV) with well developed infundibulum and a mean Zvalue of the tricuspid valve of -2.0±0.7. RV/coronary connections were present in 2 pts. Valve dilation followed PVP. Blalock-Taussig shunts (BTS) had been done in 2 pts prior to the proc. Success was achieved in all pts using the BMC system. Failures occurred in 2 pts: mechanical PVP (1) and Osypka system (1). Two pts died in the cath-lab (1 with spongy myocardium). The RV/LV systolic pressure ratio decreased from 1.5±0.2 to 0.6±0.3. Six pts required a BTS within 7-21 days with 2 deaths. During a mean follow-up of 36±12 mos, 1 pt required surgery for RV outflow tract (OT), 2 pts underwent balloon/stent dilation of the pulmonary arteries and 4 pts underwent BTS closure. Biventricular (BV) repair was achieved in 8 pts with a mean saturation of 92±5%, with free pulmonary insufficiency and a gradient <30mmHg on echocardiography. PVP for PAIVS is feasible, especially using the new RF system. In selected pts, despite the overall mortality and the need for further surgical/interventional proc, PVP provides adequate and sustained relief of the RVOT obstruction resulting in a BV circulation.

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ANTEROGRADE CLOSURE OF LARGE PATENT DUCTUS ARTERIOSUS (PDA) WITH BIOPTOME ASSISTED COIL DELIVERY.

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Percutaneous closure of large and high flow PDAs (minimal diameter >2.5mm) can be challenging and technically demanding. We report our experience with anterograde closure of such PDAs with bioptome assisted coil delivery. From 09/02, 7 patients (pts) (mean age and weight: 10 yrs and 27 kgs) underwent PDA closure. PDA types: A (6) and C (1). Mean minimal PDA diameter: 3.5± 0.7mm (2.5-4.2mm). A 7Fr braided long sheath was advanced to the descending aorta (DAo) through the PDA from a venous route. Gianturco coils (0.052" in 5 pts, 0.038" in 2 pts) were loaded into a cut-off 6Fr sheath using a 5.4Fr bioptome and advanced through the long sheath. The coil diameter was chosen to be at least twice the minimal PDA diameter with sufficient length to form 3-5 loops. Exteriorization of 2-4 loops in the DAo was followed by sheath retraction, coil wedging in the PDA and delivery of 1 loop in the pulmonary artery (PA). Angiograms monitored coil position. Adequate bioptome coil delivery was achieved in all pts. Additional coils were delivered from the Ao in 3 pts, with 1 requiring snare removal and reimplantation before adequate final position. There were no complications. All pts were discharged home the same or following day. Echocardiography before discharge revealed complete occlusion in 6 pts with no flow abnormalities in the PAs or DAo. This new technique is simple, safe and effective to close large and high flow PDAs, obviating the need to use more expensive devices (ex: Amplatzer). The maximum PDA size to safely and effectively apply this technique remains to be defined.

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PULMONARY VALVULOPLASTY WITH THE DOUBLE-BALLOON TECHNIQUE USING THE MULTI-TRACK SYSTEM

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Pulmonary valvuloplasty (PV) using the double balloon technique has been employed for patients (pts) with pulmonary valve stenosis (PVS) and large annulus. We report our experience with this procedure (proc) using the Multi-Track system (MTS). From 02/02, 6 pts (mean age: 18.8 ± 14.7 years; mean pulmonary valve annulus: 22.2 ± 2.4 mm) underwent dilation through the venous route. MTS and standard balloons (18 X 50; 16 X 50; 12 X 50) were combined and advanced over a single guide wire to the desired location. The balloon/annulus diameter ratio was 1.5 ± 0.1. Balloons were advanced, positioned, inflated, deflated and withdrawn with no technical difficulties. The peak-to-peak systolic gradient across the valve and the right ventricular/aortic systolic pressure ratio fell from 71.6 ± 29.1 to 5.4 ± 3.7 mm Hg and from 0.7 ± 0.3 to 0.3 ± 0.2, respectively ($p < 0.001$). Proc time was 1.2 ± 0.3 hrs. Mild infundibular dynamic obstruction occurred in 1 pt. There were no complications and all pts were discharged home the same or following day. On echocardiography, there was mild pulmonary insufficiency at most and no significant tricuspid regurgitation. The use of the double balloon technique with the MTS for PV in pts with PVS and large annulus is feasible, safe and effective. It simplifies the proc, obviating the need for 2 venous accesses, 2 guide-wires and an additional operator in the field.

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Fechamento da Comunicação Interatrial e do Forame Oval Patente com a Prótese de Amplatzer. Análise dos Resultados.

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Objetivo: analisar os resultados do implante percutâneo da prótese de Amplatzer em pacientes portadores de Comunicação Interatrial (CIA) e Forame Oval Patente (FOP).
Fundamento: a oclusão percutânea de defeitos septais se constitui em importante alternativa ao tratamento cirúrgico, em casos selecionados.
Material e métodos: entre março de 2001 e março de 2003 foram selecionados 44 pacientes, 29 com CIA e 15 com FOP. A idade média foi de 35 anos nos pacientes com CIA e de 49 anos nos portadores de FOP, predominando o sexo feminino 76% e 71%, respectivamente. A seleção obedeceu à critérios clínicos e ecocardiográficos: CIA tipo Ostium Secundum (OS), diâmetro < 35 mm, distância de 5mm dos bordos do defeito para o seio coronário, veia pulmonar e válvula AV, sobrecarga volumétrica de VD (SVVD),FOP com shunt D-E com história de acidente vascular cerebral (AVC) ou ataque isquêmico transitório (AIT) de etiologia obscura.
Resultados: no grupo com CIA, 5 pacientes foram excluídos na sala de intervenção. A prótese foi implantada com sucesso nos demais casos. No acompanhamento clínico variando de 1 a 24 meses (média de 9,8 meses) observou-se no grupo da CIA, regressão da SVVD em todos os casos e apenas 1 paciente apresentando shunt residual pequeno. Nenhum caso apresentou AVC ou AIT.
Conclusões: 1) O implante da prótese de Amplatzer para tratamento da CIA tipo OS e do FOP, é um procedimento seguro e eficaz.2) No acompanhamento, observa-se o desaparecimento de pequenos shunts presentes no pós imediato.

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PERCUTANEOUS CLOSURE OF BLALOCK-TAUSSIG SHUNTS (BTS)

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In some patients (pts) with congenital heart disease, BTS may no longer be necessary for adequate pulmonary blood flow (PBF). We report our experience with pecutaneous closure of these shunts. From 01/00, 5 pts underwent the procedure under general anesthesia. Age and weight varied from 15 to 48 months and 7 to 15 kgs, respectively. Underlying diseases were: pulmonary atresia with intact ventricular septum (PAIVS) (3) and critical pulmonary stenosis (1) status post percutaneous pulmonary valve perforation/dilation, and univentricular heart status post Glenn operation (1). Closure was performed 1 to 5 years after BTS operation. Four pts required angioplasty/stents in the pulmonary arteries at the same session. There was no indication for surgical repair/palliation at the time of the procedure. A balloon test occlusion of the shunt was performed before closure. Gianturco coils were delivered through 4 or 5 Fr catheters positioned selectively in the BTS from an arterial approach. Coils were implanted in an adequate position with immediate closure in all pts. There were no complications. All pts were extubated in the catheterization laboratory and discharged home the following day. In a mean follow-up of 12 months, there was no evidence (clinical or echocardiographic) of recanalization. All pts with PAIVS achieved a biventricular repair with a single source of PBF. Percutaneous closure of BTS is a safe and effective procedure and should replace surgical ligation in selected pts with multiple sources of PBF.

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PERCUTANEOUS REHABILITATION OF BLALOCK-TAUSSIG SHUNTS (BTS) WITH CORONARY STENTS

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Obstructions within BTS occur in about 10% of cases. We report our experience with coronary stent (st) implantation to rehabilitate these shunts. From 1/02, 3 patients (pts) underwent st implantation in BTS from the arterial approach under general anesthesia. Age and weight varied from 1 to 5 yrs and 8 to 15 kgs, respectively. Underlying diseases were: pulmonary atresia (2 pts) and univentricular heart with a stenotic left pulmonary artery (LPA). In the former pts, stenting was indicated to augment pulmonary blood flow while in the latter to treat a dissection within the BTS after successful angioplasty of the LPA through it. There was no indication for surgical correction at the time of the procedure (proc). Predilation, Express II sts and a 5 Fr therapeutic guiding catheter were employed in all pts. One pt required 2 sts. Heparin drip was maintained overnight, and aspirin and clopidogrel were used after the proc. Successful delivery of the 4 sts was achieved in all pts. Minimal BTS diameter increased from 1.5±0.3 to 3.8±0.2 mm. There was no complication. All pts were extubated immediately after the proc and discharged home after 1-3 days. After a mean follow-up of 6 mos, saturations remained stable and a continuous murmur was heard in all pts. Echocardiography revealed BTS patency in all pts and control catheterization confirmed this finding in a pt after 4 mos. This initial experience shows that percutaneous rehabilitation of BTS with coronary sts is feasible, safe and effective. More pts and longer follow-up are required to draw definitive conclusions.

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STENT ENDOVASCULAR (SEV) PARA COARTACION Y RECOARTACION DE AORTA: RESULTADOS INICIALES Y SEGUIMIENTO A MEDIANO PLAZO.

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En 1944 Crafoord realizó la primera correción quirúrgica de coartación aórtica (Co Ao), tratamiento de elección durante 40 años. En 1982 se realizaron las primeras dilataciones con catéter balón en recoartación (Re Co) y Co Ao nativa y en 1991 O'Laughlin colocó el primer SEV en Co Ao.
OBJETIVO Evaluar el uso de SEV (octubre/2000 a febrero/2003) en 16 pacientes con Co Ao y 2 con Re Co después de cirugía.
METODO A 18 pacientes (edad de 10+/-5 años y peso de 31+/-16 Kg) se colocó SEV. Se intentó reducir el gradiente a < 20 mm de Hg. Se midió el gradiente antes del procedimiento, a través del SEV inmediatamente después del procedimiento y por ecocardiograma estrés por lo menos 6 meses después.
RESULTADOS Se implantaron 19 SEV en 18 pacientes, el procedimiento se consideró exitoso en todos. El gradiente sistólico disminuyó de 47 mm Hg (rango 20-78) a 3 mm Hg (rango 0-10) ($p<0.001$)
Complicaciones: bradicardia transitoria (1), crisis hipertensiva (1). Un paciente falleció 2 meses después del procedimiento por neumonía sin relación al SEV. Durante un seguimiento promedio de 16 meses no se demostró Re Co, formación de aneurisma, desplazamiento o fractura del SEV. A los 16 meses, la presión sistólica disminuyó de 135+/-22 mm Hg a 106+/-20 mm Hg.
CONCLUSION El tratamiento de Co Ao y Re Co con SEV ofrece excelentes resultados a corto y mediano plazo y una buena alternativa no quirúrgica.