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Editorial

The Ross operation in rheumatic valve disease

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Intervención de Ross en la valvulopatía reumática

Ross realizó la primera intervención de autotrasplante pulmonar en 1967. Desde entonces 262 cirujanos han realizado 5.586 intervenciones con resultados diversos . Existe cierta evidencia de que esta intervención podría no ser la ideal en la cardiopatía reumática. En el All India Institute of Medical Sciences realizamos la primera operación de Ross en 1993. Por las características de nuestra población pensamos que era buena para los pacientes reumáticos y la empleamos de manera generalizada. A los 2 años un cierto número de pacientes volvieron a ingresar con insuficiencia aórtica. El ecocardiograma demostró valvas engrosadas y retraídas con falta de coaptación, sin evidencia de dilatación del autoinjerto, lo cual obligó a realizar una nueva intervención. Encontramos que hay dos factores de riesgo para reoperar estos pacientes reumáticos: a) edad joven (< 30 años), y b) enfermedad reumática y en especial con afectación mitral simultánea. Existía valvulitis reumática en la histopatología. Se ha suspendido la práctica de la operación de Ross en este subgrupo de pacientes con afectación mitral. El aspecto favorable fue la ausencia de afectación del homoinjerto pulmonar que, a los 10 años de seguimiento, presentaba un 100% de normofunción. De las 153 operaciones de Ross, 81 (52,9%) eran pacientes reumáticos. En 14 de ellos (17,3%) ha sido necesaria una reoperación. La tasa sin insuficiencia aórtica ha sido de 78,4 ± 5,2% a los 10 años y la tasa sin eventos relacionados de 64,6 ± 5,8% también a los 10 años. La recurrencia de la valvulitis reumática parece ser el factor más importante en estos pacientes y en nuestra experiencia no parece estar cubierta por la profilaxis con penicilina. En el momento actual no recomendamos la operación de Ross en los jóvenes reumáticos.

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Ross performed the pulmonary autograft aortic valve replacement (AVR) in 1967. Since then 5,586 Ross procedures have been performed by 262 surgeons with variable results[1]. Although most surgeons believe that the operation is suitable for all isolated aortic valve replacement surgery there is some evidence that it may not be suitable for patients with Rheumatic Heart Disease (RHD).

We performed the first Ross procedure in October 1993. The operation seemed to solve many of the problems for patients in India. It was relatively inexpensive, it permitted growth in the young rheumatics and eliminated the problems of anticoagulation altogether. With great enthusiasm we performed this operation for all patients with RHD combining with mitral valve repair in those who had mitral valve disease as well. The early results were excellent. These patients tolerated this extensive procedure well and survived with near perfect hemodynamic correction. Early follow-up with echocardiography demonstrated excellent autograft and homograft function. We even used this operation in combination with a mitral homograft[2] (for calcific mitral stenosis) with the hope of providing these poor patients an economically viable option for long term.

Within two years of surgery some patients returned with moderate aortic regurgitation (AR). Echocardiography showed thickened and contracted aortic cusps with poor cooptation and central AR. There was no evidence of autograft dilatation in these patients. Unable to explain these pathological findings we were obliged to undertake reoperation for AVR in these unfortunate patients. In the subsequent years several other patients also returned with similar findings. Analysis of these results clearly demonstrated risk factors for failure of the autograft in these patients[3]. They were: a) young age (< 30 years), and b) RHD, especially those with additional mitral valve disease. Naked eye (Fig. 1) and histopathological examination (Fig. 2) clearly showed evidence of rheumatic valvulitis in the excised autograft cusps. There were by this time other publications which suggested similar observations[4-8].

We therefore discontinued the Ross procedure in this group of young rheumatics, especially those with MV disease[9]. Several of these patients who had undergone the Ross procedure now received a mechanical valve in the aortic position. The one good observation at reoperation in these patients was the absence of autograft dilatation. In all patients a root replacement technique was used. In addition the pulmonary homografts used in these patients appeared normal with no

Figure 1. The excised autograft cusps–note thickening and contraction of the cusps.

Figure 2. Photomicrograph of the pulmonary autograft showing the cusp substance. There is no inflammation or vascularisation (H&E, ×80).

fibrosis or calcification. At ten years freedom from reoperation for the pulmonary homograft was 100%.

It is not clear why the pulmonary valve, when transplanted into the aortic position develops valvulitis while it remains free in its native position? Many of these patients had pulmonary hypertension, in whom we saw several advantages. The pulmonary arterial wall was as thick as that of the aorta, the valve was conditioned to function at a high pressure and the autograft explantation was easier because of the right ventricular muscle thickness (hypertrophy) avoiding any injury to the first septal branch. If high pressure were the reasons for valvulitis affecting the autograft then why it did not suffer the same fate in pulmonary hypertension is unexplained.

Of the 153 patients who underwent Ross procedure since 1993 more than half (81 patients) had RHD. However 40 were under 30 years of age, 38 had mitral (and or tricuspid) disease. Among these 14 have undergone reoperation (AVR ± MVR). The freedom from significant AR in these patients was 78.4 ± 5.2% at 10 years and event free survival was 64.6 ± 5.8%. Truly these observations clearly indicated that the Ross procedure was not suitable in the young rheumatics. Currently we do not perform this procedure for young (< 30 years) rheumatics and prefer to use an aortic homograft or a mechanical valve[9].

The possibility of recurrent rheumatic activity is higher in the young patient with RHD. This is borne out in our experience with mitral valve repair in young Rheumatics[10]. At reoperation we found fusion (MS) with thickening and contraction of the cusps within two years after repair. Microscopic examination confirmed rheumatic valvulitis. Recurrence of valvulitis does not appear to be prevented by penicillin prophylaxis. All of these patients received Benzathine penicillin, 1.2 million units every three weeks. We have also observed that recurrence of rheumatic activity is rare after the age of 30 years. Both in mitral valve repair and Ross procedure, patients over the age of 30 years, have better long term outcomes and negligible reoperation for progression of the disease. We have used these observations to select patients for the Ross II procedure as well[11].

It is now clear that transplanting the pulmonary autograft to the aortic position in young patients with rheumatic heart disease makes it vulnerable to chronic rheumatic valvulitis. For these reasons we no longer recommend or perform the Ross procedure in young rheumatics.

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