The European experience with coil occlusion of PDA: strength in numbers

Surgical ligation and/or division of the patent arterial duct ushered in the era of surgical therapy for congenital heart disease\(^1\). It was fitting, as well as ironic, that a percutaneous transcatheter technique to occlude the patent duct was one of the first groundbreaking interventional procedures promoting nonsurgical treatments for the management of congenital heart disorders\(^2\,^3\).

The material used for duct occlusion has evolved from single disc implants\(^4\) or plugs\(^5\), to transvenous double disc occluders\(^6\) and, as Magee and coauthors discuss in this issue\(^7\), coil implants. For a variety of reasons the double disc occluder never achieved USFDA approval and quickly fell out of favour outside of the United States. In addition to its cost, which was comparable to surgery\(^8\), drawbacks — including the residual shunt rate, the creation of left pulmonary artery stenosis and technical difficulties in application — spurred investigation into other technologies for transcatheter duct occlusion.

Ease of application, low cost and high occlusion rates have supported the ongoing use of one or another form of spring coils for this purpose. In 1994, Magee and colleagues, under the auspices of the Association for European Paediatric Cardiology, began a voluntary non-controlled multi-institutional study from 30 European and Middle Eastern tertiary referral centres, documenting outcomes of 1291 attempted coil occlusions (multiple types of coils implanted) in 1258 patients. Their report is published in this issue. Median patient age was 4 years and the occlusion rate at 1 year was 95%. However, in 10% of the procedures, a suboptimal outcome occurred including coil embolization in 3·8%, abandonment of the procedure in 5·7%, haemolysis in 0·9%, residual leak requiring a further procedure in 1·2%, flow impairment in either the pulmonary artery or aorta in 0·6% and recanalization after documented closure in 0·2%. While a number of clinical variables were assessed to attempt prediction of risk (their Table 1), only a greater duct diameter and tubular appearance predicted an adverse outcome. From these data, the authors conclude that coil occlusion is safe and effective.

As cardiologists caring for paediatric and adult patients with congenital heart disease, we accept these observations at face value. Indeed, they mirror other voluntary registries in North America\(^9\) where similar findings were observed. Therapeutic algorithms which allow patient comfort, rapid recovery and a high degree of end-point (occlusion) achievement at low (zero) mortality and low morbidity are to be encouraged.
Data on coil occlusion is more relevant to the paediatric than to the adolescent and adult patient. Coil occlusion of PDAs in the adult is usually possible only in the smallest of adult PDAs. The vast majority of adult ducts require closure with a plug or umbrella device.

What do we learn from voluntary, non-standardized registries? Usually very little. In this instance, the literature is replete with studies on coil implantation, noting it to be both safe and effective. Since the year this study was begun, 1994, there have been 126 publications on duct occlusion with one form or another of spring coils. These studies have promoted improved understanding of technical issues in implantation, and have described both complications and outcomes. In general, the authors have concluded that implantation of these devices worked and that their use should be encouraged. Thus, the object of the present study, to define efficacy and safety of such devices and techniques, has already been well established in the literature. The difficulty with such voluntary, uncontrolled registries is the inability to address specific in-depth technical or outcome questions due to the lack of a uniform protocol.

Nonetheless, there is strength in numbers, and the present study further confirms and encourages the application of this technology to the paediatric management of the persistently patent arterial duct.

L. BENSON  
P. R. MCLAUGHLIN  
G. D. WEBB  
Departments of Pediatrics and Medicine,  
Hospital for Sick Children & Toronto General Hospital,  
University of Toronto,  
Toronto, Canada  

References

Recurrence of atrial fibrillation and the need for new definitions  

See page 1822 for the article to which this Editorial refers

Electrical cardioversion is the method of choice in persistent, i.e. non-self terminating atrial fibrillation. However, the Achilles’ heel of cardioversion is the frequent recurrence of atrial fibrillation. It becomes increasingly important to categorize outcomes of cardioversion and to distinguish between (a) complete shock failure, (b) immediate recurrence (IRAF), (c) subacute recurrence and (d) late recurrence. First, the atria may resist the transthoracic electrical current completely: no electrical silence in the atria, i.e. complete shock failure. Next, if one single sinus beat emerges, the following 1 to 2 min are crucial since in this short time window the immediate recurrences (IRAF) happen. After the ultra short IRAF period and up to 1 to 2 weeks, the so-called subacute recurrences present, and 1 and 2 weeks after the shock the phase of the late recurrences starts. This