LETTERS TO THE EDITOR

The Jury is Still Out Regarding Balloon Therapy for Native Aortic Coarctation

We commend the pioneering work by Rao et al. (1) in balloon angioplasty. However, the data presented do not support their conclusion that balloon therapy for native coarctation of the aorta in infancy has comparable efficacy, with lower morbidity and mortality, than surgical repair. Patient selection criteria are critical in ensuring the comparability of the two patient groups. Rao et al. state that, "The sole criterion for allotment to the balloon group was the presence of the interventional cardiologist . . . ," but, in a previous report (2) that includes virtually all of the patients in the current study, four patients were excluded from balloon angioplasty, three because of the need for ductal ligation and pulmonary artery banding and one for long-segment tubular coarctation. Thus, the surgical group is biased toward more complicated arch anatomy and more severe associated cardiac defects. The recoarctation rate of 46% in the Rao et al. surgical group is higher than the 11% rate noted in their review of the published reports, perhaps consistent with this selection bias.

Rao et al. conclude from their previously published (2,3) review of published reports that the mortality rate of surgical treatment exceeds that of balloon therapy—late mortality rates of 12.8% versus 4.2%. This difference probably reflects the selection bias inherent in the balloon angioplasty studies because we and others (4) have found that late mortality is primarily due to associated cardiac defects. The Rao et al. data and our review (4) demonstrate similar early mortality. Rao et al. cite a recoarctation rate of 19% after balloon therapy on the basis of a review of the published data, but they apparently accept variable definitions of recoarctation. With uniform criteria for recoarctation applied to the pooled data of 8 balloon angioplasty studies and 18 surgical series, we found a recoarctation rate of 57% among 57 infants treated with balloon angioplasty versus 14% among 1,189 surgically treated infants (4). Infants <30 days of age may represent an especially high risk group for balloon angioplasty in view of the 78% recoarctation rate reported by Redington et al. (5) in a consecutive series of neonates.

In summary, careful analysis and further follow-up of comparable surgical and balloon treatment groups are needed before we can conclude that balloon angioplasty is as good as surgical treatment for native coarctation of the aorta in infants.

MARK C. JOHNSON, MD
ARNOLD W. STRAUSS, MD
Division of Pediatric Cardiology
St. Louis Children's Hospital
Washington University School of Medicine
St. Louis, Missouri 63110

References

1. Rao PS, Chopra PS, Kosctik R, Smith PA, Wilson AD. Surgical versus balloon therapy for aortic coarctation in infants ≤3 months old. J Am Coll Cardiol 1994;23:1479–83.
2. Rao PS, Thapar MK, Galal O, Wilson AD. Follow-up results of balloon angioplasty of native coarctation in neonates and infants. Am Heart J 1990;120:1310–4.
3. Rao PS. Balloon angioplasty of native aortic coarctation. In: Rao PS, editor. Transcatheter Therapy in Pediatric Cardiology. New York: Wiley-Liss, 1993:153–96.
4. Johnson MC, Canter CE, Strauss AW, Spray TL. Repair of coarctation of the aorta in infancy: comparison of surgical and balloon angioplasty. Am Heart J 1993;125:464–8.
5. Redington AN, Booth P, Shore DF, Rigby ML. Primary balloon dilatation of coarctation of the aorta in neonates. Br Heart J 1990;64:277–81.

Reply

We appreciate and thank Johnson and Strauss for their interest in our recent report (1). Although we agree that there is no unanimity of opinion among pediatric cardiologists and pediatric cardiovascular surgeons with regard to choice between balloon and surgical therapy for native aortic coarctation, we do not agree with their statement that we concluded that balloon therapy has lower mortality than surgical treatment. We clearly stated that mortality rates (both operative and late) are similar in balloon and surgical groups in our study (1). Furthermore, we suggested that mortality in both groups is related to associated cardiac defects and that it is *not* related to the type of intervention performed for relief of coarctation. Johnson and Strauss also comment that our surgical group has more severe associated cardiac defects than our balloon group. This is *not* true. In our surgical group, 7 (50%) of 14 patients had significant associated defects, including three large ventricular septal defects, two severe aortic or subaortic stenoses and one each of double-inlet left ventricle and complete transposition of the great arteries with ventricular septal defect. In our balloon group, 8 (53%) of 15 patients had significant associated defects, not significantly different ($p = 0.873$) from the surgical group. These defects were three large ventricular septal defects, two severe aortic stenoses and one each of double-inlet left ventricle, common atrioventricular canal with right dominance and mitral and aortic stenoses with hypoplastic left ventricle, again similar in type and severity of defects to the surgical group.

Now, with regard to review of published reports and comparison of surgical repair and balloon angioplasty, we scrutinized all reports published between 1980 and 1991 and compared them (1,2). In an attempt to have comparable time periods during which both surgical and balloon interventions were performed, we examined the results in infants (<1 year old) who underwent intervention between 1970 and 1990. The prevalence of associated heart defects was very similar at 70% in both groups. The initial mortality rates (5 [7%] of 75 patients in the balloon group vs. 82 [13.5%] of 607 in the surgical group) were similar ($p > 0.1$), whereas late mortality rates in the balloon group (3 [4.2%] of 70) were lower ($p < 0.01$) than those in the surgical group (66 [12.8%] of 517). Recoarctation rate in the balloon group (14 [19%] of 75) was similar ($p > 0.05$) to that in the surgical group (59 [11.4%] of 517). In contradistinction, Johnson et al. (3) chose to look at surgical results published after 1984, but eliminated if patients had repair before 1970. Thus, results of patients operated on between 1970 to 1991 were included in the surgical group. With regard to the balloon angioplasty group, they included reports between 1983 and 1990 (i.e., angioplasty between 1982 and 1990). Therefore, it seems that the Johnson et al. study (3) did not use comparable time periods during which balloon and surgical interventions were performed. Although neither our (2) nor the Johnson et al. (3) comparisons from the review of published reports are ideal, the Johnson et al. study is restrictive and does not use comparable time periods during which interventions were performed, and perhaps these are the reasons for difference in results of comparison.

Beginning with our initial experience with balloon angioplasty (4–6), we had the clinical impression that balloon angioplasty

0735-1097/94/$7.00