Complete Atrioventricular Block Induced during Left Heart Catheterization

Masatoshi KUROKI, M.D., Uichi IKEDA, M.D.,
Toshitaka NODA, M.D., Saichi HOSODA, M.D.*, and Toshio YAGINUMA, M.D.

SUMMARY

Complete atrioventricular block (CAVB) during cardiac catheterization is a rare complication. We describe a patient with preexisting complete right bundle branch block who developed CAVB during left-sided cardiac catheterization. CAVB was induced when a left-sided catheter was passed through the aortic valve. We speculate that the patient's His bundle was injured by mechanical compression. Physicians should always pay attention to the possibility of the development of CAVB during cardiac catheterization, particularly in patients with preexisting heart block.

Additional Indexing Words: His bundle  Temporary pacing  Right bundle branch block

The development of complete atrioventricular block (CAVB) during cardiac catheterization has been reported in patients with preexisting bundle branch block. Most cases have occurred during right-sided procedures in patients with preexisting left bundle branch block (LBBB). We report the development of CAVB during a left-sided procedure in a patient with preexisting complete right bundle branch block (RBBB).

CASE REPORT

A 51-year-old man with hypertension was admitted because of recurrent chest pain. The admission electrocardiogram showed complete RBBB and normal atrioventricular conduction (PR time=0.16 sec) without findings of myocardial infarction (Fig. 1). Cardiac catheterization was performed using a Swan-Ganz catheter, a Miller’s catheter and a Judkins catheter. Pressure studies, left ventriculography and coronary angiography showed
normal findings. When a left-sided catheter (Miller’s catheter) was passed through the aortic valve, the patient developed CAVB for 10 sec, with the appearance of an escape rhythm of 20 to 30 beats/min (Fig. 2). Temporary transvenous pacing at 60 beats/min was immediately performed. AV con-
duction resumed after approximately 4 min, followed by a Wenckebach and first degree AV block (Fig. 3). Subsequent His bundle electrocardiograms demonstrated normal AH (110 msec), BH (15 msec) and HV (52 msec) times (Fig. 4).

**DISCUSSION**

Heart block during cardiac catheterization is an uncommon complication which can be related to mechanical injury of the conduction system, vaso-vagal reflex or myocardial ischemia. The aggregated incidence from previous reports is approximately 0.14%. The development of RBBB induced by mechanical compression during a right-sided procedure could occur in as many as 3% to 12% of patients due to the right bundle branch being thin, long and unbranched. Because the left bundle branch is broadly distributed over the left septal surface as a diffuse fanlike structure, peripheral LBBB damage due to mechanical compression is uncommon.

In our case, the conduction system was impaired not at the periphery, but at the intra-His bundle because the escape beat during CAVB showed the same QRS complex pattern as the baseline electrocardiogram. Most of the His bundle travels within the inferior margin of the membranous septum, and injury of the intra-His bundle or origin of the left bundle branch could occur at the posterior sinus of Valsalva or annulus of the aorta in close proximity to the membranous septum. In this case, CAVB developed in the presence of a preexisting RBBB as in other cases; however it could occur in a normal individual through injury of the intra-His bundle during a left-sided procedure.

Although CAVB during cardiac catheterization is a very rare complication, there are some cases which require permanent pacing, or can be fatal. Physicians should always pay attention to the possibility of the
development of CAVB during cardiac catheterization, particularly in pa-

tients with preexisting heart block.

REFERENCES

1. Stein PD, Mathur VS, Herman MV, Levine HD: Complete heart block induced during cardiac catheterization of patients with preexisting bundle branch block. Circulation 34: 783, 1966


