Antithromboembolic Treatment After Cardiac Valve Replacement

TATSUHIKO KUDOH, M.D.

Antithrombic medication is effective in the prevention of thromboembolic complications after valve replacement. Therapy with oral anticoagulant (warfarin), platelet inhibitor drugs and long-term warfarin administration all have good clinical results.

However, thrombosis may occur in the early postoperative period, when the oral administration of warfarin is impossible. We have evaluated treatment with urokinase, low-dose heparin and dipyridamole, administered intravenously, instead of warfarin, during the early postoperative period.

This procedure was carried out in 30 patients, among whom there was no evidence of thrombosis or of such side-effects as bleeding or a marked tendency to bleed.

THOUGH the results of cardiac valve replacement in the treatment of valvular diseases have markedly improved in recent years, thromboembolism, a postoperative complication of valve replacement, shows no reduction in incidence, regardless of whether a bioprosthesis or a mechanical valve is used. As thromboembolism is severe in many cases, its prevention is important and antithromboembolic treatment by medication is effective for this purpose. The method of administration and other clinical details are dealt with in this paper.

Thromboembolic Complications

Postoperative thromboembolic complications are classified by severity into two groups, major and minor complications. The major complications include cerebral embolism, arterial embolism of the extremities, thrombosed valve, etc.; these are severe in many cases. The minor complication include dizziness, numbness of the extremities, dysarthria, etc.; these are transient in many cases. The incidence of thromboembolism varies according to the cardiac valve used, the surgical procedure (AVR or MVR) or the administration of medicarion. The incidence is higher in cases where such dangerous factors as atrial fibrillation, giant left atrium, a history of embolism or a thrombus of the left atrium are present. There is no difference regarding the incidence of thromboembolism between bioprosthesis and mechanical valve use, but discontinuation of anticoagulant treatment is in many cases characteristic of bioprosthesis use. The incidence of embolism was 1.7% per year in AVR patients and 2.6% per year in MVR patients when Hancock porcine xenografts were used, whereas it was 0.7% per year in AVR patients and 4.2% per year in MVR patients when Björk-Shiley valve were used. Thromboembolism develops mostly in the early postoperative period, especially in the first three months, because in this period the effect of medication is unstable, blood coagulability lowered by the operation, becomes higher again and endocardium formation is insufficient in the perivalvular tissue and in the operative wound of the left atrium. Therefore, it is necessary to take positive preventive measures, based on medication, against the development of thromboembolism, and it is especially desirable to continue

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Department of Cardiovascular Surgery, Hachioji Medical Center, Tokyo Medical College, Tokyo, Japan
Mailing address: Tatsuhiko Kudoh, M.D., Department of Cardiovascular Surgery, Hachioji Medical Center
Tokyo Medical College, Tate-machi, 1163 Hachioji-shi 193, Tokyo
antithrombic medication for a long period after the operation.4

**Antithrombil Medication**

In preventive measures against thromboembolism, antithrombic medicines take a leading part. Antithrombic medicines which are currently in use are as follows: (1) medicines which act on the blood coagulation system (heparin, warfarin); (2) medicines which inhibit the function of platelets (ASA, dipyridamole, ticlopidine); (3) thrombolytic agents (urokinase); (4) medicines which expand blood volume (low molecular dextran); and others. In clinical use, several kinds of antithrombic medicines, which differ from each other in mechanism of action, are jointly administered in many cases. We use antithrombic medicines immediately after the operation. During the first postoperative days, when oral administration is impossible, medication is given as follows: urokinase 96,000 IU per day, is given intravenously in 2–4 divided doses; heparin 6,000 IU per day and dipyridamole, are continuously administered intravenously and, when oral administration of warfarin has become possible, the injection doses are decreased (Fig. 1). Urokinase has a high thrombosis-preventive effect and a low incidence of bleeding as a side-effect. When medication with warfarin becomes possible, the thrombost is controlled as soon as possible to bring it within 10–30% limits. As a rule we administer warfarin for a long period whether bioprostheses or mechanical valves have been used, and in MVR patients warfarin is used with an antiplatelet agent.

**Antithrombic Treatment**

In addition to medication, the following supplementary measures are effective in preventing thrombosis. When patients show arterial fibrillation and bradycardia in the early postoperative period, the heart rate is made to increase by pacing so as to maintain a regular rhythm. It is better to continue pacing until the thrombost is lowered by administration of warfarin. Catheters and similar equipment inserted during the operation are removed at an early stage, because they are apt to be thrombogenic. In particular, a pressure monitor catheter in the left atrium or a Swan-Ganz catheter should not be retained in place for a long period. When a diuretic is used at a high dose for the treatment of congestive heart failure, it must be given carefully, because an increase in urine volume sometimes results in dehydration or hemoconcentration. Patients are made to leave their beds as early as possible after the operation. In the late postoperative period it is necessary to maintain the thrombost within 10–30% limits by administering warfarin. Thrombosis develops when the thrombost is higher than the upper limit and a tendency to bleed is observed when it is below the lower limit.5 The following must be guarded against in order to maintain the thrombost within the limits necessary for treatment: (1) the use of warfarin with an antagonistic or a potentiating drug; (2) hypofunction of the liver; (3) intake of vitamin K; (4) intake of natto (a traditional Japanese food); and (5) failure to take warfarin.

**Clinical Results**

We performed cardiac valve replacement in 30 patients from March 1981 to February 1982 (Fig. 2). The surgical procedures performed were AVR in 13 cases, MVR in 12 cases, AVR with MVR in four cases, and TVR in one case. The valves used were Björk-Shiley valves in 19 cases, S.T.Jude medical valves in nine cases, and Ionescu-Shiley valves in two cases. Antithrombic treatment was carried out in the 30 patients from immediately after the operation. None of the patients showed thromboembolic complications or such side-effects as bleeding or a tendency to bleed.

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REFERENCES