

The Aorto-aortic Bypass Operation as a Potential Procedure for the Treatment of Aortic valve Infection and Resistant Endocarditis

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Following the report of Hufnagel and Harvey⁸⁾ in 1952, the treatment of aortic incompetence by aortic valve replacement has become a standard procedure for more than a decade¹⁰⁾. Occasionally, the prosthetic valve becomes infected and the resistant endocarditis necessitates an urgent surgical replacement and re-replacement in the most unfavourable situations where the tissue is mushy, edematous and friable. The incidence of dehescence of the valve and the risk of surgery in these critical circumstances are well documented^{5,6)}. An alternative operation as a bypass was described in 1963 by Al-Naaman^{2,3)} and was successfully performed on the first clinical case with two years follow up⁴⁾. This forgotten operation to be described might be an alternative procedure for such difficult situations.

Surgical Technique

Originally, the procedure was performed on the first clinical case through a left posterolateral incision and the chest was entered through the resected fourth rib. The valved conduit was anastomosed end-to-side to the ascending and descending aorta. After deairing, the partial occlusion clamps on the aortas are removed and immediately the ascending aorta proximal to the innominate artery was occluded about 75% by an umbilical tape (Fig. 1).

The procedure was performed without the use of the extracorporeal circulation.

This approach might be difficult to be used when the patient's aortic valve is to be removed and the area to be debrided. It is therefore, preferable to use the classical midsternotomy incision and extending it to the midline into the abdomen exposing the supraceliac abdominal aorta as suggested by Cooley⁷⁾ et al, as an alternative anastomosis to the descending thoracic aorta for easier access. The arterial blood returns via the femoral or external iliac artery. After the infected valve is removed and the tissue completely debrided and cleaned, the conduit

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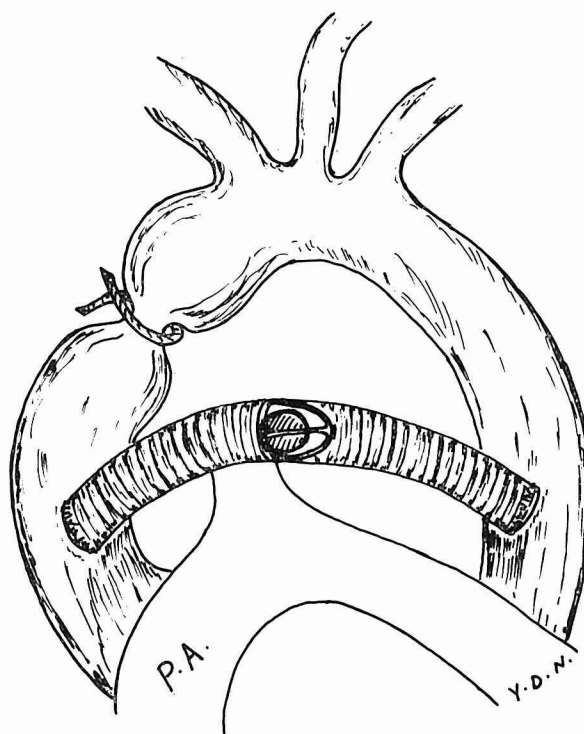


Fig. 1 Aorto-Aortic bypass showing the valved conduit between the ascending and descending aorta. The ascending aorta is occluded about 75% with umbilical tape.

is sutured to the aortotomy incision, the umbilical tape around the aorta proximal to the innominate artery is tied down occluding the lumen about 75%. This is done after air is evacuated from the conduit and the bypass starts to function. The creation of the stenosis is an important step in the procedure since it does increase coronary perfusion by increasing the diastolic pressure in the ascending aorta, and also reducing the left ventricular work load through minimizing aortic regurgitation (Fig. 2).

Comment

This procedure does not completely correct the residual incompetence left as the result of the insertion of the valve conduit distal to the coronaries. The clinical improvement noticed on the first case and the reduction in the left ventricular mass suggested that the residual incompetence was not hemodynamically significant^{2,3,4,9}. An alternative procedure which would completely correct the incompetence is the use of the bypass principle from the apex of the left ventricle to the thoracic¹ or to the abdominal aorta⁷ after completely obliterating the left outflow tract by a patch sutured proximal to the coronaries. Here again, the same problem of rejection will be encountered by the use of a foreign body (patch) in an infected tissue.

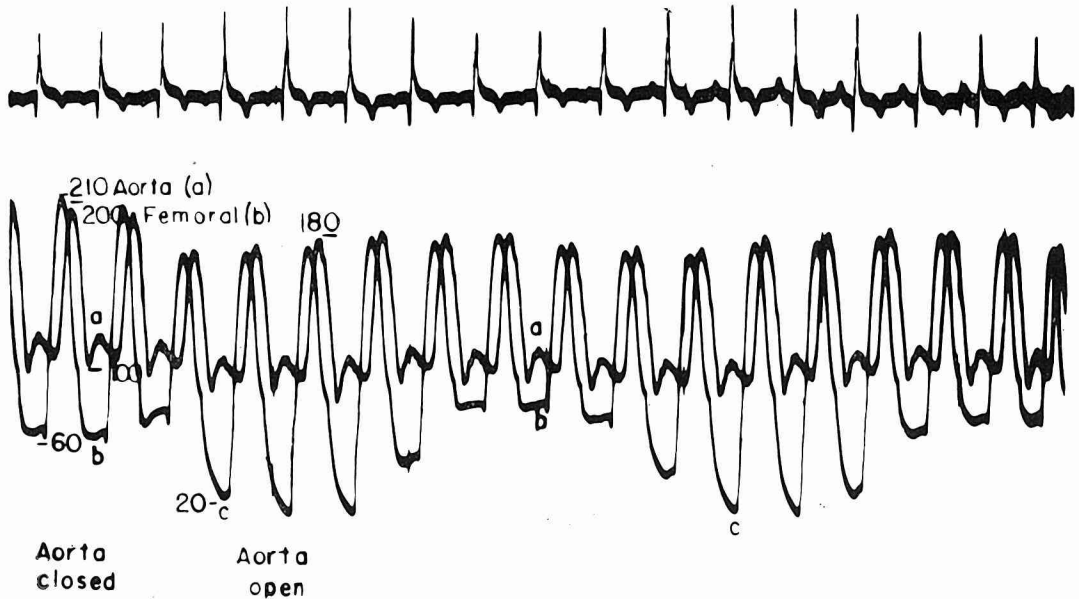


Fig. 2 A continuous tracing from the femoral artery and the ascending aorta showing the alteration in hemodynamics following occlusion and release of the ascending aorta proximal to the innominate artery. The bypass is functioning as indicated by a normal femoral pressure (a). The diastolic pressure in the ascending segment of aorta (b) is lower than the pressure in the femoral artery at the time of aortic occlusion. The diastolic pressure in the ascending aorta drops significantly when the aorta is released (c).

Summary

A new operation for the treatment of resistant endocarditis with aortic valve prosthesis was suggested. The infected valve is removed and a bypass valve conduit is placed between the ascending and preferably into the supracoeliac part of the abdominal aorta through the diaphragm.

References

- 1) Al-Naaman, Y. D.: By-pass procedure for aortic stenosis simplified. *Med. Tribune*: 4, 27 (1963).
- 2) Al-Naaman, Y. D., Rogers, W. M., Maksad, A. K. and Deterling, R. A. Jr.: Experimental production of aortic Insufficiency and correction with ball valve by-pass. *Bull. Int. Soc. Chir.* 3, 229-236 (1962).
- 3) Al-Naaman, Y. D., Maksad, A. K., Attar, S. A., Ayoob, A., Rogers, W. M. and Deterling, R. A. Jr.: A new surgical procedure for aortic regurgitation (report of the first clinical case. *J. Cardiovas. Surg.* 4, 45-47 (1963).
- 4) Al-Naaman, Y. D., Thamer, M. A. and Maksad, A. K.: Two-year follow-up on a new surgical procedure for the correction of aortic insufficiency without the use of the extracorporeal circulation. *J. Cardiovas. Surg.* 6, 58-61 (1965).
- 5) Arnett, E. N. and Roberts, W. C.: Prosthetic valve endocarditis. *clinopathologic*

- analysis of 22 necropsy patients with comparison of observation in 74 necropsy patients with active infective endocarditis involving natural left sided cardiac valves. *Am. J. Cardiology* **38**, 281-292 (1976).
- 6) Boyd, A. D., Spencer, F. C., Isom, O. W., Cunningham, J. N., Reed, G. E., Acinapura, A. J. and Tice, D. A.: Infective endocarditis; an analysis of 54 surgically treated patients. *J. Thor. Cardiovas. Surg.* **73**, 23-30 (1977).
 - 7) Cooley, D. A., Norman, J. C., Reul G. J., Kidd, J. N. and Nihill, M. R.: Surgical treatment of left ventricular outflow obstruction with apicoaortic valved conduit. *Surgery* **80**, 674-680 (1976).
 - 8) Hufnagel, C. A. and Harvey, W. P.: The surgical correction of aortic regurgitation; preliminary report. *Bull. Georgetown Univ. Med. Center* **6**, 60-61 (1952).
 - 9) Hufnagel, C. A. and Gomes, M. N.: Late follow-up of ball-valve prostheses in the descending thoracic aorta. *J. Cardiovas. Surg.* **72**, 900-909 (1976).
 - 10) McGoon, D. C.: Valvular replacement and ventricular function. Editorial, *J. Thor. and Cardiovas. Surg.*: **72**, 326-327 (1976).