OUR EXPERIENCES WITH ADULT TYPE AORTIC COARCTATION

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ABSTRACT

BACKGROUND: Adult patients with coarctation of the aorta may require different treatment modalities and surgical methods from children. A total of five adult aorta coarctation cases who underwent operations in our clinic were reviewed.

METHODS: In this article, we describe five adult aortic coarctation cases between 22 and 62 years old (33.8±17) who underwent operations between 1998 and 2004. There was preoperative hypertension in all five cases. We performed patch plasty operations with PTFE grafts under aortic cross-clamping in three patients, and bypass operations with 8 mm PTFE grafts under aortic partial clamping in the other two. The mean aortic cross-clamp time of the patch plasty patients was 38,6±8,5 min, and the mean aortic partial clamping time of the bypass patients was 52±12 min.

RESULTS: We found paradoxical hypertension 24 h after the operation in two cases (1st and 2nd patients), 48 h after the operation in the third and 72 h after the operation in the remaining two (4th and 5th patients). We observed no perioperative neurogenic complications or mortality.

CONCLUSION: Surgical treatment of coarctation of the aorta in adults usually alleviates hypertension and reduces the need for antihypertensive drugs. A bypass between proximal and distal segments of the aorta that have normal wall structure is a reliable method, with lower morbidity and mortality rates in older patients.

INTRODUCTION

Coarctation of the aorta is seen in 0.02-0.06% of live births but is rare in adult patients.[1,2] Untreated patients die before the age of 50 years owing to hypertension and related problems.[3,4] Since related morbidities are not irreversible in early stages of the condition, appropriate treatment modalities should be tried in order to decrease mortality before complications occur. Adult patients with coarctation of the aorta may require different treatment modalities and surgical methods from children. Because adult cases are rarely reported in the literature and different treatment modalities are applicable, we present in this paper five adult patients who underwent operations for coarctation of the aorta in our clinic.

CLINICAL SERIES

A total of five adult aorta coarctation cases operated upon in our clinic were reviewed.

Case 1: A 62-year-old female patient applied to the Cardiology Clinic complaining of chest pain and palpitation. On physical examination, hypertension was found and no pulse could be detected bilaterally in the lower extremity arteries. Echocardiography revealed no valvular pathology. Coronary arteries are normal. A short, concentric, tubular, significant aorta coarctation was detected in the thoracic aorta just after the left subclavian artery, creating a 50 mmHg pressure gradient detected in aortic angiography. An eight mm polytetraflouroethylene (PTFE) graft was inserted by left posterolateral thoracotomy between the left subclavian artery and the descending thoracic aorta. Postoperatively, the arteries were palpable in the upper and lower extremities.

Case 2: A 37-year-old patient contacted Emergency Services complaining of sudden and serious headache. She was hospitalized in the Neurosurgery Clinic with a diagnosis of intracranial hemorrhage due to hypertension. On physical examination, a murmur was oscultated in the carotid arteries and the chest. Echocardiography revealed no valvular pathology. Magnetic resonance imaging (MRI) angiography showed two coarctations in the thoracic aorta, just proximal and distal to the left subclavian artery. A three cm dila-

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tation was detected in the distal aorta. An eight mm PTFE graft was bypassed by partial upper sternotomy and left posterolateral mini thoracotomy between the ascending and thoracic aorta.

Case 3: Hypertension was detected in a 22-year-old male patient who complained of headache. On physical examination, arterial pulses in the upper extremities were more intense than in the lower extremities. Echocardiography showed mild mitral valvular regurgitation, mild aortic valvular regurgitation and stenosis, and also bicuspid aortic valve. MRI angiography showed short, segmentary, severe aortic coarctation proximal to the descending aorta, and poststenotic aortic dilatation. Patch plasty using PTFE was applied to the coarcted segment under cross-clamping of the aorta via left posterolateral thoracotomy.

Case 4: While his hypertension was being investigated, weak pulses in the lower extremities were noted in a 24-year-old patient. Trans-esophageal echocardiography revealed bicuspid aorta, aortic root dilatation and aortic coarctation. In a MRI angiogram, coarctation of the descending aorta in the orifice of the left subclavian artery was detected along with pre and poststenotic dilatation of the aorta. A patch plasty operation using PTFE under cross clamping of the aorta was performed via left posterolateral thoracotomy.

Case 5: A 24-year-old male patient complaining of vertigo and loss of sensation in the left arm applied to the Cardiology Outpatient Clinic. On physical examination, hypertension, a systolic murmur on heart auscultation and weaker arterial pulses in the lower extremities were detected. Echocardiography showed mild aortic valve and tricuspid valve regurgitation. Angiography revealed aortic coarctation just after the left subclavian artery with a 100 mmHg pressure gradient. MRI examination showed thoracal aortic coarctation just distal to the orifice of the left subclavian artery. A patch plasty operation using PTFE under cross clamping of aorta was performed via left posterolateral thoracotomy.

RESULTS

There was preoperative hypertension in all five cases. We performed patch plasty operations with PTFE grafts under aortic cross-clamping in three patients, and bypass operations with 8 mm PTFE grafts under aortic partial clamping in the other two. The mean aortic cross-clamp time of the patch plasty patients was 38,6±8,5 min, and the mean aortic partial clamping time of the bypass patients was 52±12 min. We found paradoxical hypertension 24 h after the operation in two cases (1st and 2nd patients), 48 h after the operation in the third and 72 h after the operation in the remaining two (4th and 5th patients). We treated the postoperative hypertension with nitroglycerine and nitroprusside drips in two cases and an additional beta-blocking agent in three cases. We observed no perioperative neurogenic complications or mortality. At the first examination following discharge, the anti-hypertensive regimen was stopped in three patients. The dosage of beta-blockers was reduced in one patient and an ACE-inhibiting agent was substituted for the beta-blockers in one patient.

DISCUSSION

Coarctation occurs most commonly in the region of the thoracic aorta just distal to the left subclavian artery. Coarctation symptoms may range widely from asymptomatic to cardiac collapse. Hypertension usually occurs in the upper part of the body. As the condition progresses, post-stenotic aneurysms often develop in the distal portion of the coarctated aorta but rarely in the proximal portion. Coarctation was located just distal to the left subclavian artery in all the cases in our series.

The most common symptoms of adult type coarctation of the aorta are hypertension proximal to the coarctation and intermittant claudication of the lower extremities with exercise. Increased blood pressure in the proximal aorta may cause an aneursym to develop and may result in rupture of the Willis circle. Rupture of the aortic aneursym, aortic dissection, heart failure and myocardial infarction are other complications. There was a history of intracranial hemorrhage in one case in our series and poststenotic aortic dilatation in another.

Several surgical techniques, such as resection of the coarctated segment and end-to-end anastomosis, interposition of a graft, patch aortoplasty, subclavian aortoplasty, balloon dilatation and bypass procedures with a synthetic graft between the proximal and distal segments can be used in treatment. In

three middle-age patients in our series, PTFE pach plasty was applied. A left subclavian-to-descending aorta bypass operation was preferred in one of the older patients who had excessive calcification of the aorta (6,7). A bypass procedure was preferred in two older patients because of the possibility of advanced atherosclerosis and degeneration of the aortic wall, which may result in undesirable surgical complications such as sudden aortic rupture. Following operations for coarctation, several complications such as hemorrhage, paradoxical hypertension, paraplegia, phrenic nerve injury, chylothorax, recurrent nerve paralysis, infection, Horner syndrome, and mesenteric and left arm ischemia may occur. Paradoxical hypertension occured and was treated postoperatively in our patients. There were no other complications.

CONCLUSIONS

Surgical treatment of coarctation of the aorta in adults alleviates hypertension or reduces the need for antihypertensive drugs. A bypass procedure between the proximal and distal segments of the aorta where the wall structure is normal is a reliable method, with less morbidity and mortality rates in older patients.

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