

CARDIAC SURGERY IN A  
COMMUNITY GENERAL  
HOSPITAL

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## Cardiac surgery in a community general hospital

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**D**uring the 10 year period 1953 to 1962, 66 patients with disease of the heart and great vessels within the thorax amenable to surgical correction were operated upon at the Lancaster General Hospital. In this group of 66 consecutive patients, there was no operative mortality. The operations were all performed by the author with the expert assistance of his friend and colleague, William E. DeMuth, M.D., of Carlisle, Pa.

In the group of 66 patients, there were 23 with congenital disease, i.e., patent ductus arteriosus, coarctation of the aorta, pulmonary stenosis, and aorticopulmonary fistula, and 43 with acquired disease, i.e., mitral stenosis, constrictive pericarditis, and heart block. In the congenital group, the results of definitive correctional surgery have been uniformly successful. In the acquired group, the results have been good in 74 percent and fair in 7 percent, with a 19 percent late mortality.

### CONGENITAL DISEASE

**Patent ductus arteriosus.** There were 15 patients operated upon for patent ductus arteriosus (Table I). Of these, 12 were females and 3 were males, and the age range of the group was from 4 to 26 years. The patients operated on all exhibited a wide pulse pressure and a "machinery type" murmur typical of patent ductus arteriosus. In 3 patients, cardiac catheterization was done preoperatively to confirm the clinical impression, and division of the patent ductus

arteriosus was carried out in all but one of the patients. The patient in which the ductus was ligated was a 13-year-old girl with a huge heart whose head shook with each beat of the heart. She had been turned down for surgery at Johns Hopkins Hospital previously, and when I saw her, I sent her to Harry Zinsser, M.D., at the Hospital of the University of Pennsylvania for cardiac catheterization. Dr. Zinsser confirmed the diagnosis of patent ductus arteriosus and recommended surgery. At operation the ductus was very wide and thin, and ligation was done rather than division. Now, 10 years after the operation, there is no cardiac murmur and the heart size is normal. The patient has been married for the last 3 years and lives a normal life. The end result in all cases of patent ductus arteriosus is good, with all patients alive and completely normal and well from 1 to 10 years after operation.

**Aorticopulmonary fistula.** One patient, a 6-year-old boy with clinical findings typical of patent ductus arteriosus, was operated upon and at exploration a large aorticopulmonary window at the root of the aorta was found. This patient was operated on before the advent of open-heart surgery and so nothing was done at the time, it being thought that he could be helped later when the heart-lung machine was developed. Unfortunately, the child was killed 4 years later when he ran into the street while playing and was struck by a car. At that

**Table I.** *Good result. ductus arteriosus; 14 ligated*

Age (years)	Sex
13	F
4	M
26	F
13	F
4	F
19	F
24	M
5	F
7	F
5	F
4	F
4	M
12	F
4	F
4	F

time, aged 10 years were unchanged and mal life.

**Coarctation of the** patients with coarctation underwent operation were females ranging years and all exhibit upper extremities, no absent pulses and pressure in the legs. suffered a cerebral va hemiplegia before th and residual effects main to this day, alth and does her own t the coarctation with sis of the aorta was patients, all of whom type of coarctation. (

**Table II.** *Good result*

Age	S
13	
23	
21	
31	
17	
36	

**Table I.** Good results in 15 cases of patent ductus arteriosus; 14 divided, 1 (Case 1) ligated

Age (years)	Sex	Blood pressure	Follow-up (years)
13	F	130/0	10
4	M	118/50	10
26	F	150/70	10
13	F	135/68	10
4	F	110/60	9
19	F	120/70	9
24	M	150/50	8
5	F	110/60	7
7	F	100/60	6
5	F	110/60	6
4	F	110/50	4
4	M	90/48	4
12	F	120/50	1
4	F	104/60	1
4	F	110/40	1

time, aged 10 years, the clinical findings were unchanged and he was leading a normal life.

**Coarctation of the aorta.** There were 6 patients with coarctation of the aorta who underwent operation. All of the patients were females ranging in age from 13 to 36 years and all exhibited hypertension in the upper extremities, notching of the ribs, and absent pulses and unobtainable blood pressure in the legs. One of the patients suffered a cerebral vascular hemorrhage with hemiplegia before the diagnosis was made, and residual effects of the hemiplegia remain to this day, although she is ambulatory and does her own housework. Excision of the coarctation with end-to-end anastomosis of the aorta was carried out in 5 of the patients, all of whom had the short, adult type of coarctation. One patient, a 13-year-

old girl, had a long, infantile type of coarctation, which was excised and the defect bridged by a homograft. This patient has now been followed for 10 years postoperatively and her blood pressure is 130/90, with good pulses throughout both lower extremities. The long-term results in all cases have been good, with follow-up of 4 to 10 years after operation. All patients are symptom-free with normal blood pressures and good pulses throughout both lower extremities. Two of the patients have married since the operation and each has gone through two full-term deliveries without event.

**Pulmonary stenosis.** A number of patients with pulmonary stenosis were seen and all were sent to Dr. Zinsser for cardiac catheterization. Only one of these patients was advised to undergo operation. This was a 25-year-old female with beginning right heart failure and a right ventricular pressure of 108/11 and a pulmonary artery pressure of 20/8. Pulmonary valvulotomy was performed through the right ventricle and a good result was obtained. The patient has been followed for 7 years and has no murmur or cardiac symptoms. Unfortunately, she developed multiple sclerosis 2 years ago and this disease process is slowly incapacitating her.

#### ACQUIRED DISEASE

**Mitral stenosis.** Forty patients were operated upon for predominant mitral stenosis. The youngest patient was 16 years of age and the oldest was 57. Thirty-two were females and 8 were males.

Eight patients were classified as having Grade 2 rheumatic heart disease with mitral

**Table II.** Good results in 6 cases of coarctation of the aorta

Age	Sex	Blood pressure		Follow-up (years)
		Preoperative	Postoperative	
13	F	172/142	130/90	10 (Homograft)
23	F	180/110	138/90	10 (2 children postoperatively)
21	F	190/120	130/90	10 (2 children postoperatively)
31	F	210/120	130/90	8 (preoperative stroke)
17	F	170/100	120/90	6
36	F	140/100	120/80	4

stenosis. The predominant symptoms in this group of patients were increasing dyspnea with exertion and easy fatigability. Thirty-one patients were classified as having Grade 3 rheumatic heart disease with mitral stenosis. In this group of patients the predominant symptoms were hemoptysis and marked dyspnea on exertion and a history of cardiac decompensation controlled by drugs. There was one patient with Grade 4 rheumatic heart disease with mitral stenosis predominant, aortic regurgitation, and tricuspid insufficiency.

Most of the patients exhibited auricular fibrillation, either prior to surgery or postoperatively, and no attempt was made to produce normal rhythm in any patient. Four patients had embolization prior to surgery, and one of these underwent a mid thigh amputation of the leg 6 months before mitral commissurotomy.

Cardiac catheterization was done preoperatively by Dr. Harry Zinsser at the Hospital of the University of Pennsylvania in 30 percent of the patients. In preparation for surgery, all of the patients were hospitalized 4 or 5 days prior to the day of operation and during this period were "wring out" by means of diuretics.

All of the operative procedures were performed through a left posterolateral thoracotomy incision, and the mitral valve was then approached through the left auricular appendage. A large left auricular thrombus found in one patient was removed prior to commissurotomy. There was no embolization caused by the operative procedure in any patient.

Sixteen patients exhibited a minimal regurgitant jet prior to commissurotomy, but in none of these was the regurgitation increased by the operative procedure. Twenty-four patients had no regurgitant jet prior to or following commissurotomy.

The size of the valve orifice prior to commissurotomy ranged from 0.4 to 1.0 cm. and, following commissurotomy, from 2.5 to 4.5 cm. Commissurotomy was accomplished in the majority of patients by the finger-fracture technique in both anterolateral and

posterolateral commissures. In several cases it was necessary to use the method of Beck, wrapping the tip of the index finger with umbilical tape and then fracturing the commissures.

Twenty-five percent of the patients exhibited the typical postcommissurotomy syndrome, with chest pain controlled by regular doses of aspirin. There were no postoperative wound infections or pulmonary complications and there was no operative mortality.

The long-term results in the 40 patients are good. All were brought along slowly after surgery and the convalescent period ranged from 3 to 6 months. Twenty-nine (72.5 percent) of the patients are in good health 1 to 9 years postoperatively. They live a normal life without restriction and carry on their usual activities. Three patients (7.5 percent) are in fair health and restrict some of their normal activities. Of the 32 living patients, 14 are taking digitalis or diuretics in some form and all take prophylactic oral penicillin.

Eight (20 percent) of the patients have died within 1 to 9 years following mitral commissurotomy. Of these 8 deaths, 4 occurred at the time of reoperation in other hospitals on the heart-lung machine 4 to 9 years after the original commissurotomy and 4 were due to a progression of the rheumatic heart disease.

Of the 5 patients who underwent open-heart surgery after the original commissurotomy, only 1 survived. This patient was reoperated upon 9 years after the original commissurotomy and at the present time is doing well.

**Constrictive pericarditis.** One patient, a 34-year-old man, was operated on for constrictive pericarditis. This patient, with marked ascites and a huge liver, had been incapacitated for months. His blood pressure was 100/65 and his venous pressure was 265 cm. H<sub>2</sub>O. Pericardectomy was done through a median sternotomy incision with excellent results. Now, 4 years postoperatively, the patient carries on a normal life working as a laborer without restriction.

Table III. Forty patients operated upon for mitral stenosis

Age	Sex	Grade	Preoperative size	Regurgitation	Postoperative size	Reoperation	Postoperative year	Result	Postoperative year	Drug therapy
33	F	3	0.4	-	3.5					
30	F	3	0.5	-	3.0	Open	8	Died	9	+
31	F	2	0.4	-	3.5					+
39	F	3	0.6	-	2.5	Open	9	Died	9	+
30	F	3	0.4	-	3.5	Open	9	Good	1	+
35	F	2	0.5	-	4.0			Good	9	-
36	F	3	0.8	-	3.0			Good	9	-
37	M	3	1.0	-	3.0			Good	8	-
20	F	3	0.4	-	4.0			Fair	8	+
42	F	3	1.0	-	3.0	Open	5	Died	5	+
47	F	3	1.0	+	3.0			Good	8	-
51	F	3	0.5	-	4.0			Fair	8	+
46	F	3	0.8	+	3.0			Good	7	-
54	F	3	0.5	-	4.0			Good	7	+
51	F	3	0.8	+	3.0			Good	7	-
36	F	2	0.5	-	3.5			Died	4	+
30	F	2	0.5	-	3.5			Good	7	-
18	F	3	0.5	+	3.5			Good	7	-
47	F	3	0.8	+	3.0			Good	7	-
28	F	2	0.5	-	4.0			Died	3	+
27	F	2	1.0	-	3.0			Good	6	-
16	M	2	0.8	+	4.0			Good	6	+
50	M	3	0.8	+	2.5			Good	5	+
39	F	2	0.5	-	3.0	Open	4	Died	4	+
48	F	3	0.8	+	3.0			Good	5	-
35	M	3	0.6	+	3.5			Good	5	+
32	F	3	0.5	-	3.0			Fair	4	+
33	F	3	0.5	+	3.0			Good	4	-
44	F	3	0.5	+	4.0			Good	4	-
34	M	3	0.5	+	3.5			Good	4	+
36	M	4	0.8	+	3.5			Good	4	-
45	M	3	0.6	+	2.5			Died	1	+
49	F	3	0.8	-	4.0			Good	3	+
41	F	3	0.5	-	4.0			Good	3	+
45	F	3	0.8	-	4.0			Good	3	+
26	F	2	0.5	-	3.0			Good	3	+
57	F	3	0.8	+	3.0			Good	3	-
31	M	3	0.5	-	4.5			Good	2	+
53	F	3	0.5	+	4.0			Good	1	-
47	F	3	0.8	-	3.0			Good	1	-
								Good	1/2	-

Long-term follow-up

Good 29 (72.5 percent)  
 Fair 3 ( 7.5 percent)  
 Died 8 (20.0 percent: 4 at time of reoperation on heart-lung machine; 4, 9 years after original operation)

Table IV. Two patients with implanted cardiac pacemaker for heart block

Age	Sex	Diagnosis	Pacemaker rate	Result	Months	Comment
58	M	Heart block	R-72	Good	12	Epilepsy due to trauma to head during preoperative syncope attacks
68	M	Stokes-Adams disease	R-62	Good	6	

**Heart block.** Two patients have been operated on for heart block and have received an implantable internal cardiac pacemaker. The first patient, a 58-year-old man, suffered repeated attacks of heart block with syncope, during which he fell and struck his head many times. The trauma to the head resulted in transient epilepsy prior to surgery. This patient has had an excellent postoperative result and no recurrence of the

heart block. He works out daily at a gymnasium and is leading an active, normal life one year postoperatively. The second patient, a 68-year-old man suffering from Stokes-Adams disease, received an internal cardiac pacemaker and has also done well. Although retired, he works in his garden and lives a normal life 6 months after operation.