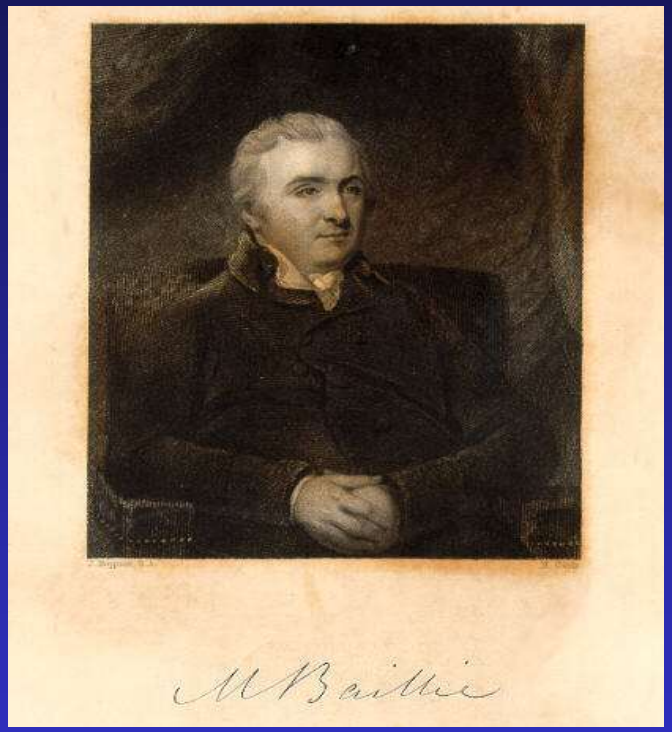
The Thrilling History of World´s Development of Ttreatment of Congenital Heart Defects with Comparison of the same Development in Czechoslowakia

Martin Kostelka M.D.

Heartcenter Leipzig, University Leipzig

Helios Kliniken, Fresenius AG

TGA First Description



Matthew Baillie 1797

TRANSPOSITION OF VESSELS

"A very singular malformation of the heart, in a child about two months old, came some time ago into my possession, which I shall describe in this place. The aorta in this heart arose out of the right ventricle, and the pulmonary artery out of the left. There was no communication between the one vessel and the other, except through the small remains of the ductus arteriosus, which was just large enough to admit a crow quill. The foramen ovale was a little more closed than in a child newly born. The heart was of the common size for a child of two months old and, except for the circumstances which have been stated, had nothing remarkable in its structure. In this child a florid blood must have been always circulating between the lungs and the left side of the heart, except for the admixture of the dark blood which passed through the small communication of the foramen ovale; and a dark blood must have been always circulating between the right side of the heart and the general mass of the body, except for the very small quantity of florid blood which passed into the aorta by the remains of the ductus arteriosus. Life must, therefore, have been supported for a very considerable length of time with hardly any florid blood distributed over the body. I regret that I have only been able to collect a very imperfect account of the child when alive. The child had a most unusually livid skin, which arose from the very small proportion of the florid blood in the general circulation. The surface of the child's body felt colder than that of a child properly formed and in good health; the respiration was natural. When any similar malformation shall occur, it could be wished that the heat of the surface of the body, and of the internal parts, were measured accurately by a thermometer. The heat of the internal parts will be most conveniently measured by putting a small thermometer into the rectum."

—From Matthew Baillie, *The Morbid Anatomy of Some of the Most Important Parts of the Human Body*, 2d American edition, Walpole, N. H., 1808, pp. 33-34.

THE MORBID ANATOMY OF SOME OF THE MOST IMPORTANT PARTS OF THE HUMAN BODY, zd American edition, i 808, pp. 3 3-34

TOF First Description 1888

Contribution à l'Anatomie pathologique de la Maladie bleue

(Cyanose cardiaque)

Par le Dr A. FALLOT

Un de ces hasards heureux qui viennent parfois procurer au clinicien de précieuses occasions de s'instruire, a, dans l'espace de quelques années, fait passer sous nos yeux trois cas d'une maladie rare et curieuse, sur l'anatomie pathologique de laquelle règnent, même dans le public médical instruit, de graves erreurs et de singulières incertitudes : nous avons eu l'occasion d'observer pendant leur vie et d'autopsier après leur mort, trois sujets atteints de cette maladie appelée *cyanose cardiaque*, et qu'il serait, suivant nous, bien plus correct de désigner exclusivement sous le nom de *maladie bleue*. Deux de ces cas ont été étudiés sous la direction de notre excellent maître le professeur Girard, durant la durée de notre clinicat à l'Hôtel-Dieu. Un double fait nous frappa : — la concordance presque parfaite, la similitude à peu près absolue des lésions constatées chez nos deux malades; — la dissemblance profonde existant entre ces lésions

E. L. A. Fallot:
Contribution à l'anatomie pathologique de la maladie bleue (cyanose cardiaque).
Marseille médical, 1888, 25: 77-93, 138-158, 207-223, 341-354, 370-386, 403-420.

The First Heart Suture

22.04.1897: 26. Kongress der DGfC

„ Meine Herren! Die Ausführbarkeit der Herznaht Dürfte wohl von jetzt an nicht mehr in Zweifel gezogen werden.“

IX.

Ueber penetrirende Herzwunden und Herznaht.

Von

Professor Dr. L. Rehn
in Frankfurt a. M.[1]).

POČÁTKY VELKÝCH OBJEVŮ VE FYSIOLOGII

Alexis Carrel

1901 cévní steh,
koronární bypass z a. carotis,
náhradu tepny žilním cévním segmentem,
cévní homotransplantáty,

transplantace orgánů:
štítná žláza, slezina, ovaria, ledviny a srdce

Nobelova cena 1912
- cévní steh, transplantace krevních cév a orgánů

The PDA Ligatur 26.8.1938

Seven years old girl
His chief prof. Ladd was on holiday

SURGICAL LIGATION OF A PATENT DUCTUS ARTERIOSUS

REPORT OF FIRST SUCCESSFUL CASE

ROBERT E. GROSS, M.D.
AND
JOHN P. HUBBARD, M.D.
BOSTON

Robert E. Gross (1905–1988), Professor of Surgery, Harvard University and Boston Children's Hospital.

POČÁTKY KARDIOCHIRURGIE U NÁS

OTEVŘENÁ TEPENNÁ DUČEJ

Emmerich Polák

8. 10. 1946

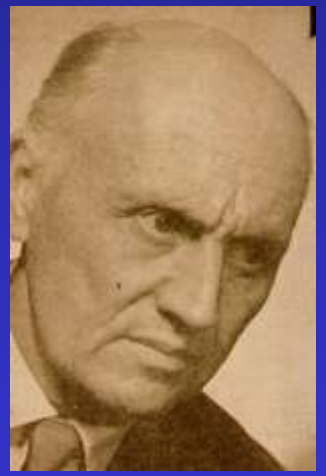
Jan Bedrna

30. 10. 1947

Vladislav Rapant

1948

Václav Kafka

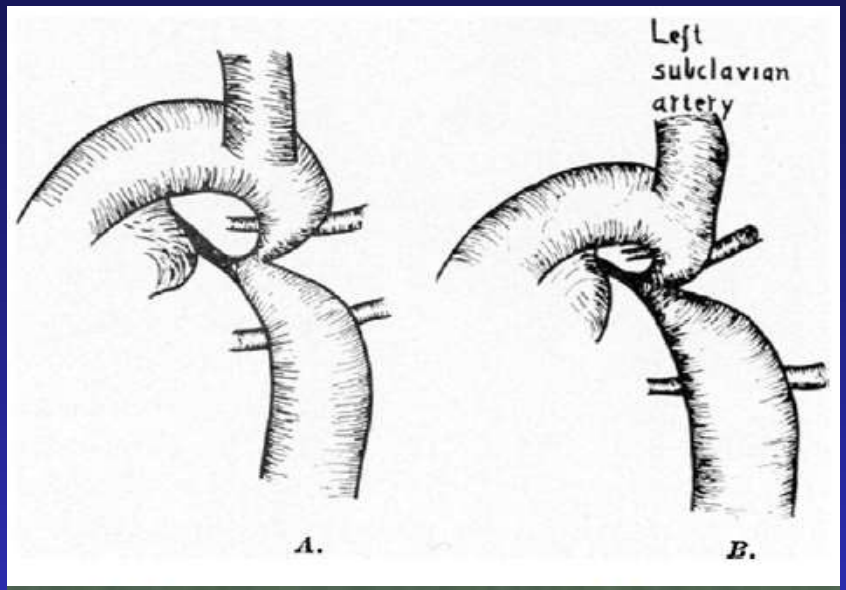


29. 6. 1949

The COA Resection 19.10.1944

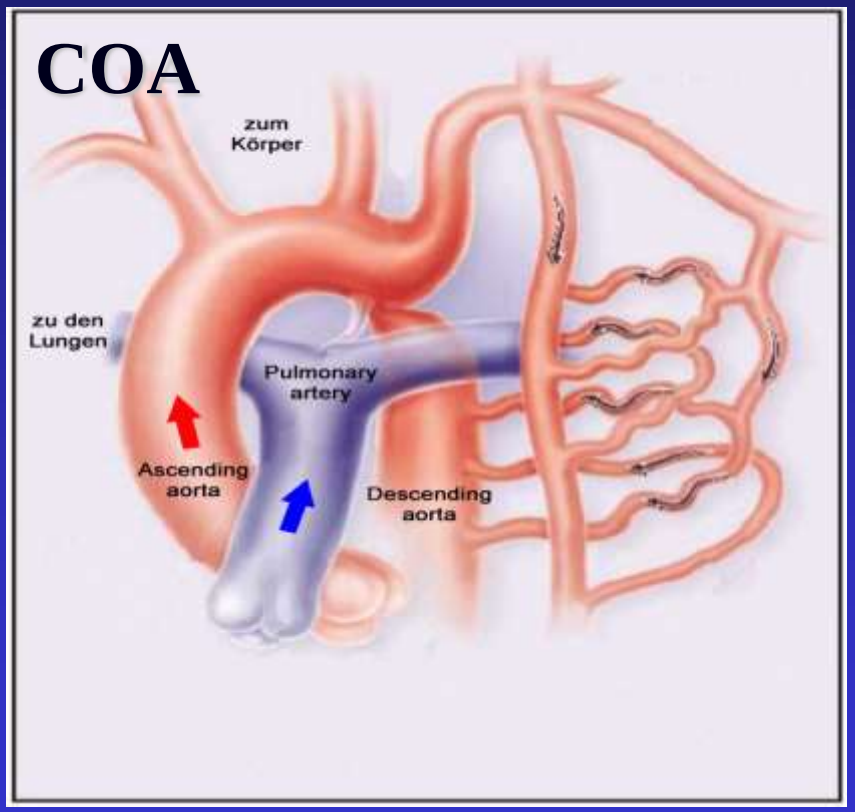
Clarence Crafoord Karolinska Institute

Fig 1. Clarence Crafoord (at the center) and Åke Senning (across to the right of Crafoord) operating at Sabbatsberg Hospital in Stockholm in 1949. The "spiro-pulsator" used during the operation is seen in the foreground.



The COA Resection 1949 Olomouc

Vladislav Rapant



The Blalock Taussig Shunt 29.11.1944

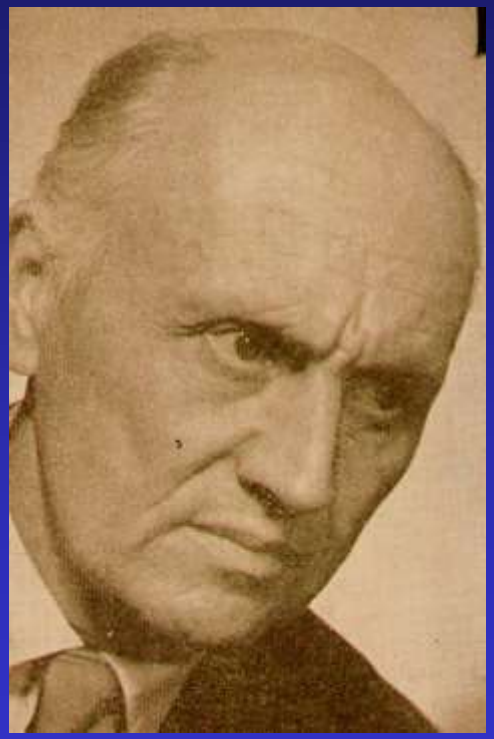
Helen B Taussig

Alfred Blalock

Vivien Thomas

PEDIATRICKÁ KARDIOCHIRURGIE V PRAZE

Václav Kafka



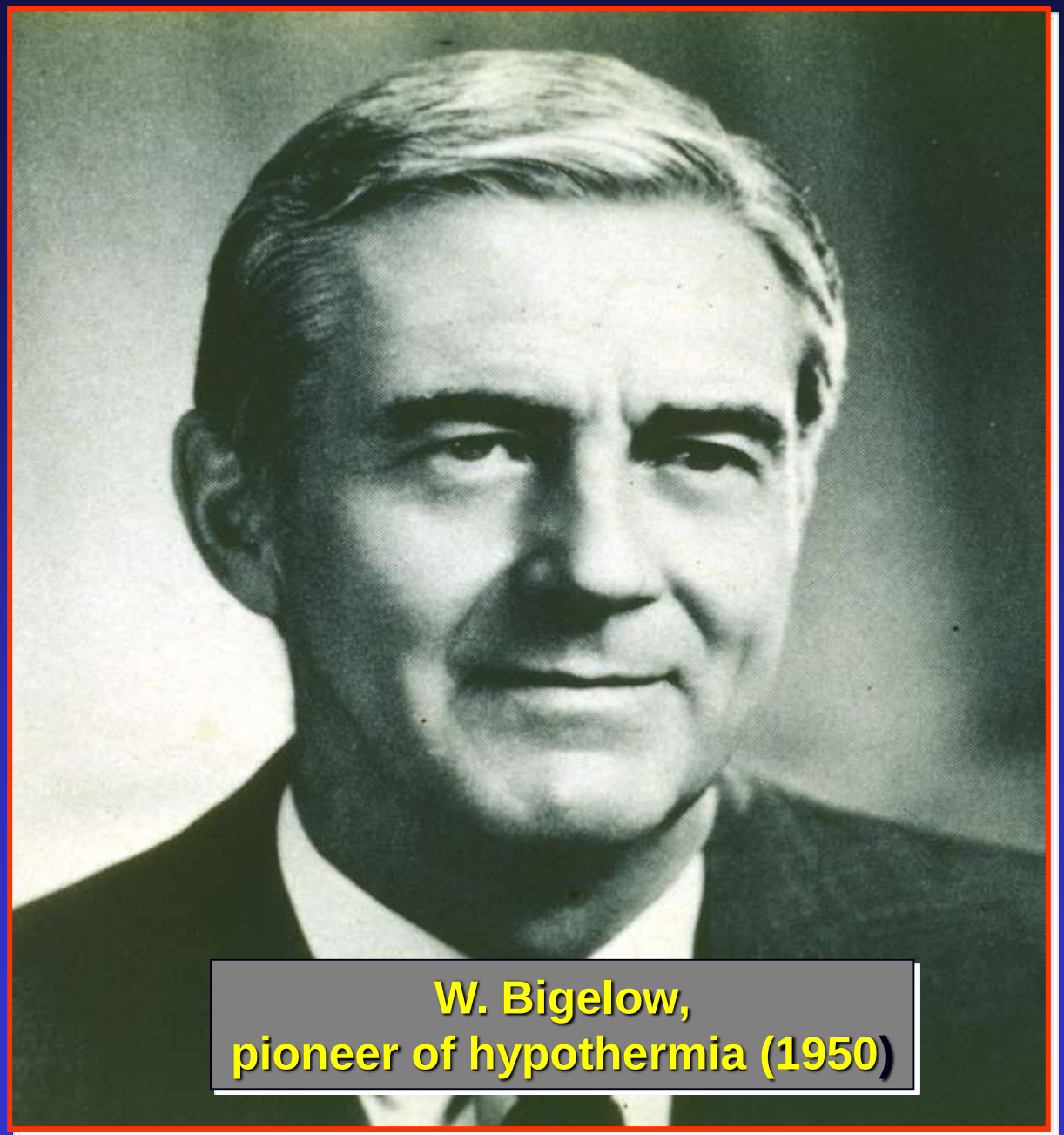
1949 ligatura otevřené tepenné dučeje na II. chirurgické klinice v Praze u prof. Diviše.

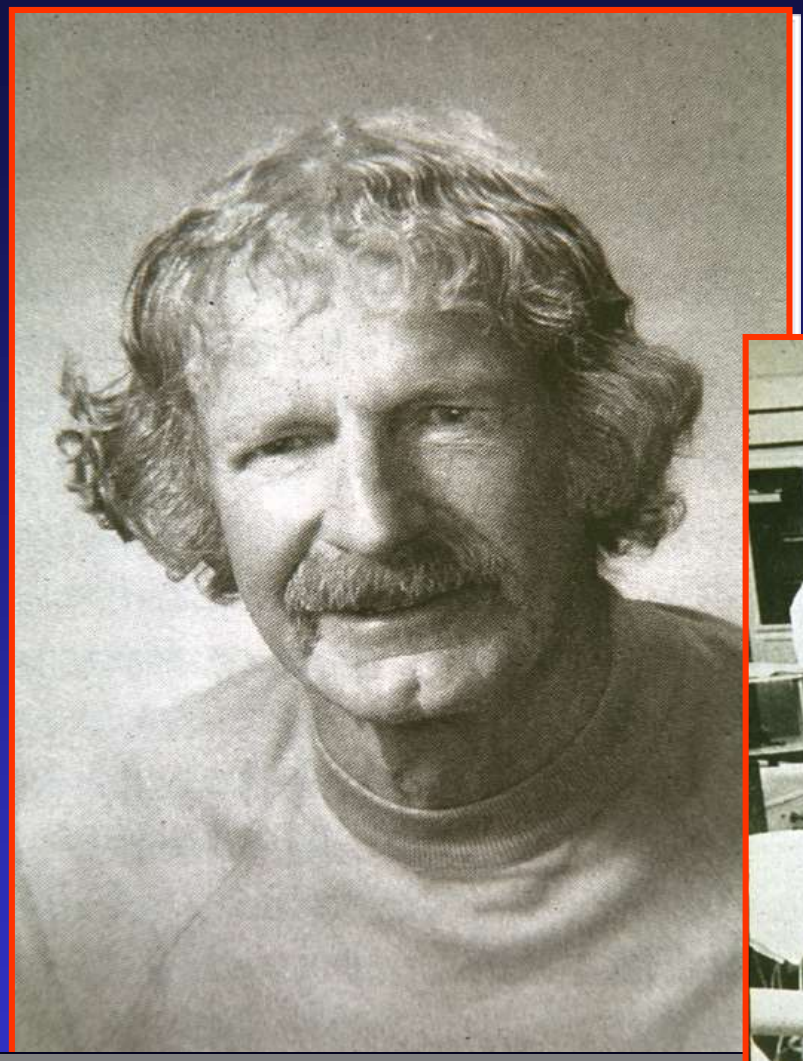
Spojka podle Blalocka a Taussigové 1951

v r. 1952 spojka podle Pottse.

“Early” Developments Open Heart Surgery

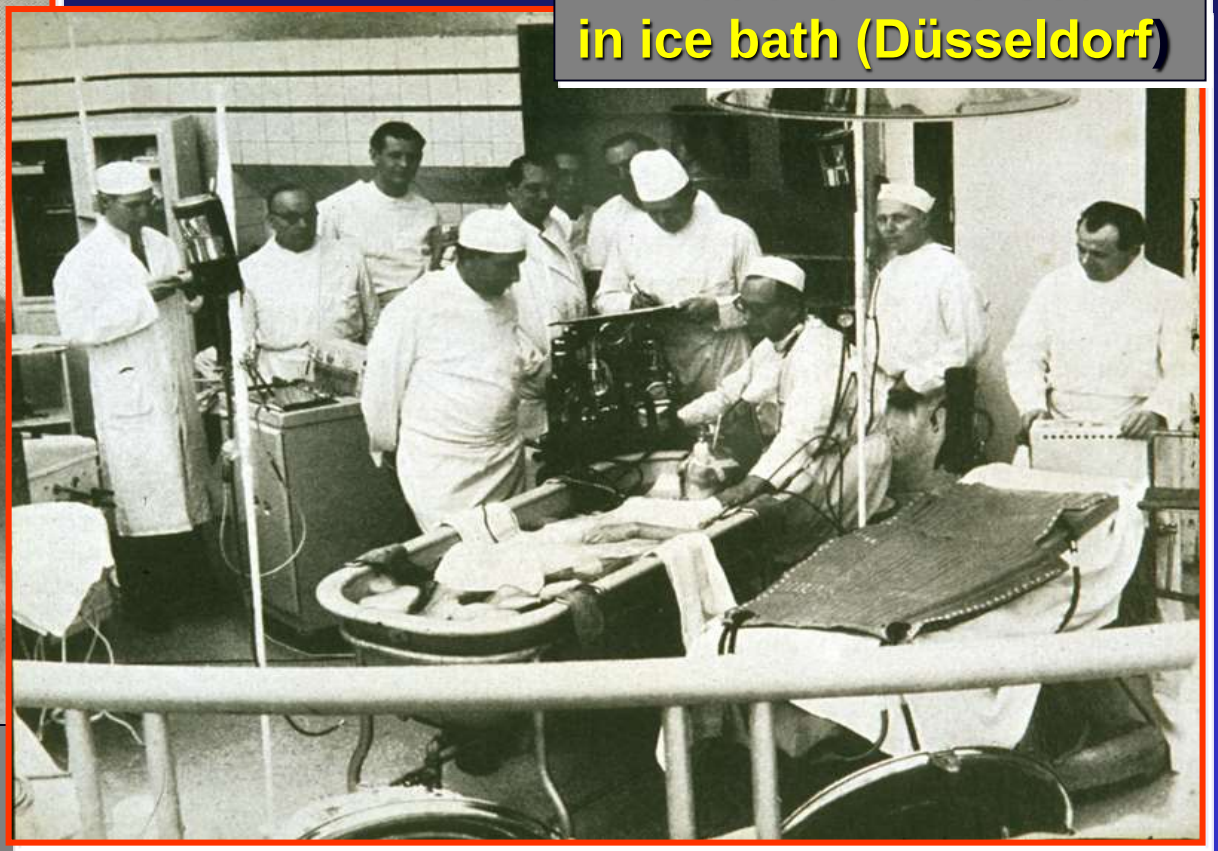
- early 1900s endotracheal intubation/anaesthesia
- late 1940s in-flow (venae cavae) occlusion
- early 1950s Bigelow : hypothermia
- Sept 1952 Lewis : hypothermia + inflow occlusion
- May 1953 Gibbon : extracorporeal circulation
- Dec 1954 Lillihei : cross circulation


W. Bigelow,
pioneer of hypothermia (1950)



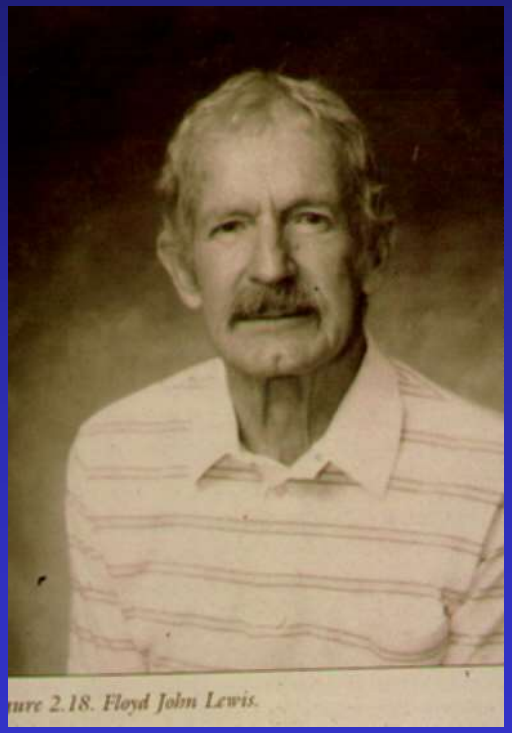
F.J. Lewis,
1st successful operation
in hypothermia + inflow occlusion
(1952)

Patient immersed
in ice bath (Düsseldorf)



OPERACE NA OTEVŘENÉM SRDCI V ZÁSTAVĚ CIRKULACE

Floyd John Lewis

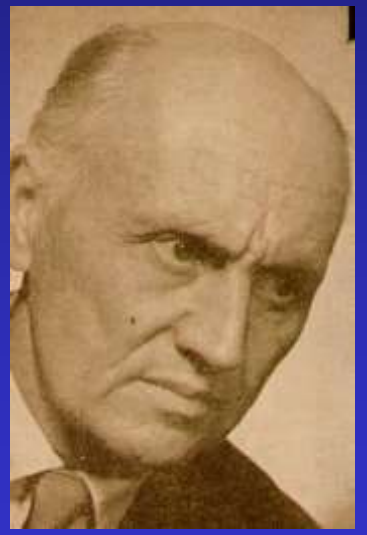


Minnesota
1952

Jan Navrátil

Brno
1956

Václav Kafka



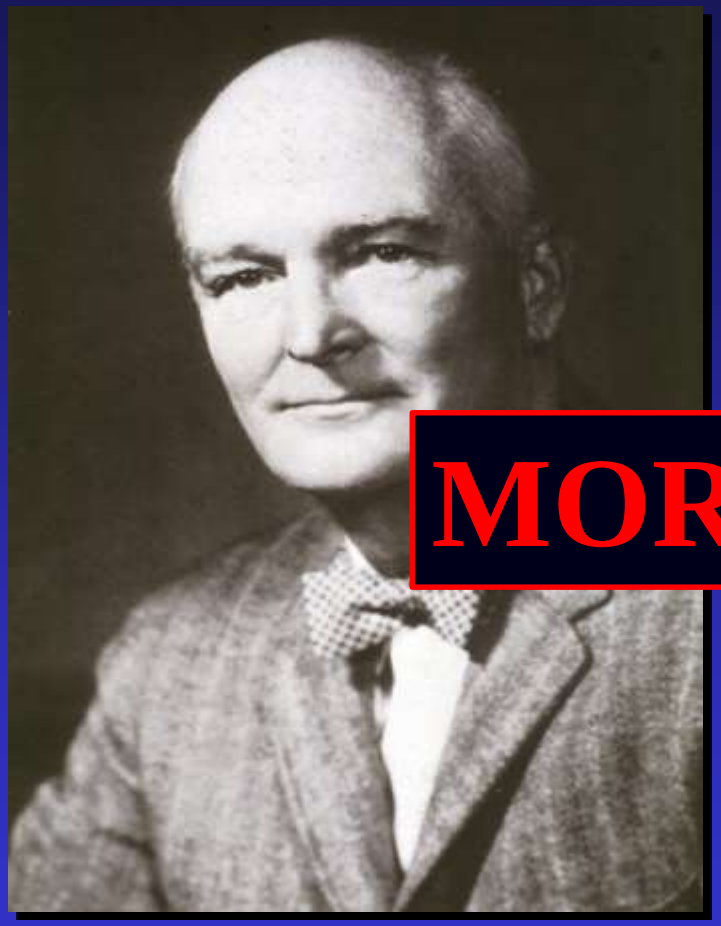
Praha
1958

CHD Surgery : "Open" Procedures

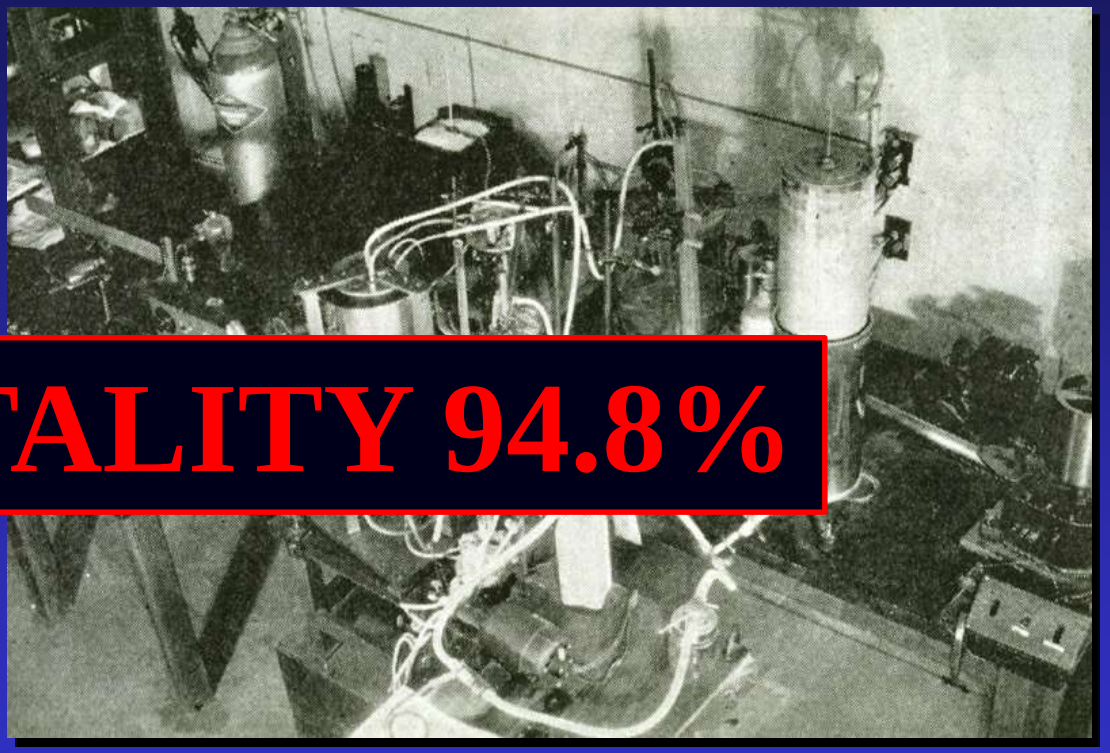
- 1953 ASD (with CPB) — Gibbon , Philadelphia
- 1954 Fallot (x circulation) — Lillehei , Minnesota
- 1955 bubble oxygenator — DeWall , Minnesota
- 1957 atrial switch — Senning , Zurich
- 1971 single ventricle op — Fontan + Baudet , Bordeaux
- 1971 DHCA — Barratt-Boyes , New Zealand

NB ! E-type prostaglandins Circulation 1976; 53:728 (Olley)

The First Open Heart Surgery with CPB



J. Gibbon, 1953
1st clinical use of ECC



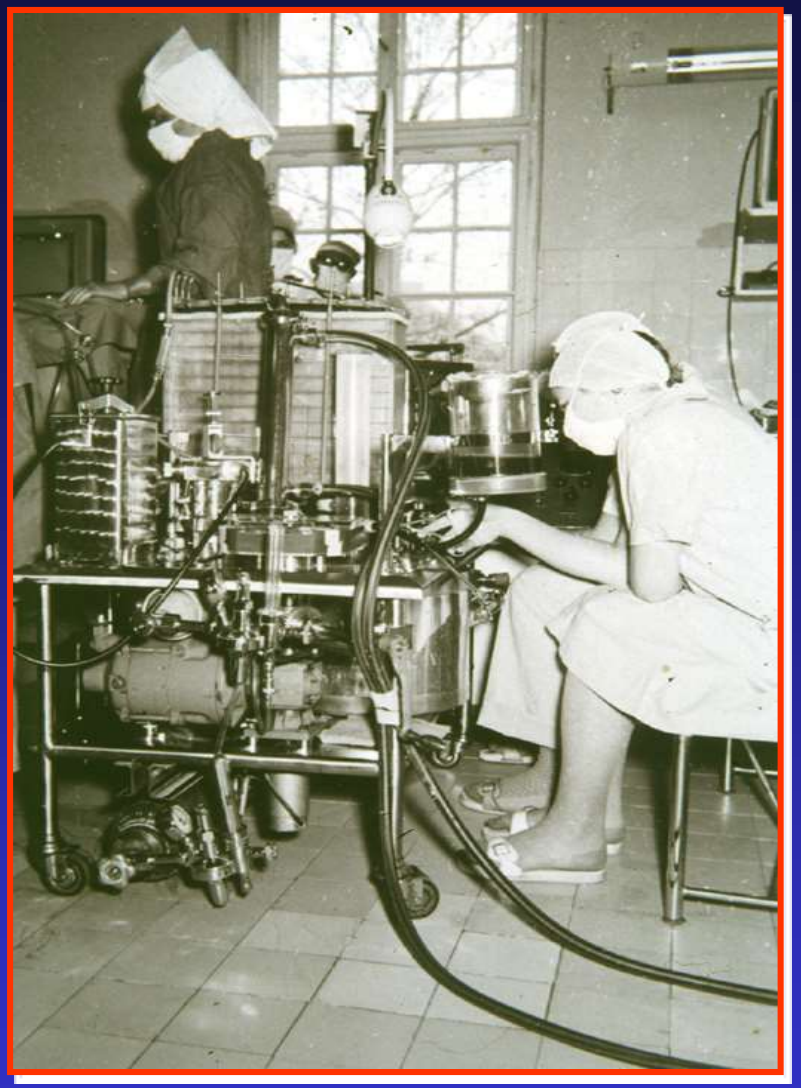
MORTALITY 94.8%

Gibbon's machine in 1939

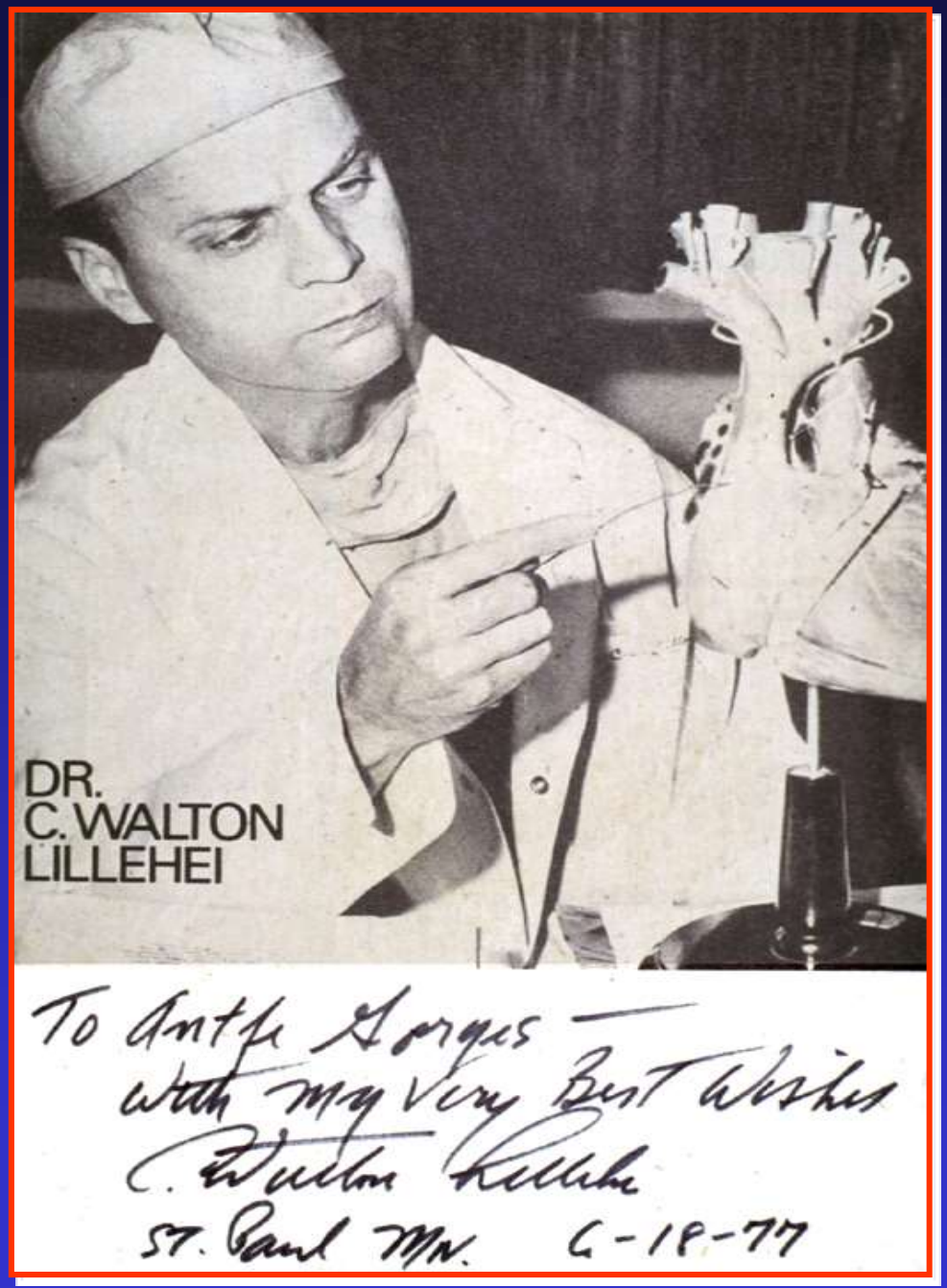
Early Open Heart Surgery with Heart-lung Machine

• C.Dennis	1952	2/2	Died
• J.Gibbon	1953	5/6	Died
• J.Helmsworth	1953	1/1	Died
• D.Dodrill	1953	2/2	Died
• G.Clowes	1953	2/2	Died
• W.Mustard	53/54	5/5	Died
		17/18	94.5%

Mayo-Gibbon
clinical pump-oxygenator,
1953



Home-made
screen oxygenator,
Munich 1958



C.W. Lillehei, pioneer of cardiac surgery

Lillehei : Controlled Cross Circulation 1954

University of Minnesota (? Ethics Committee)

December 1954

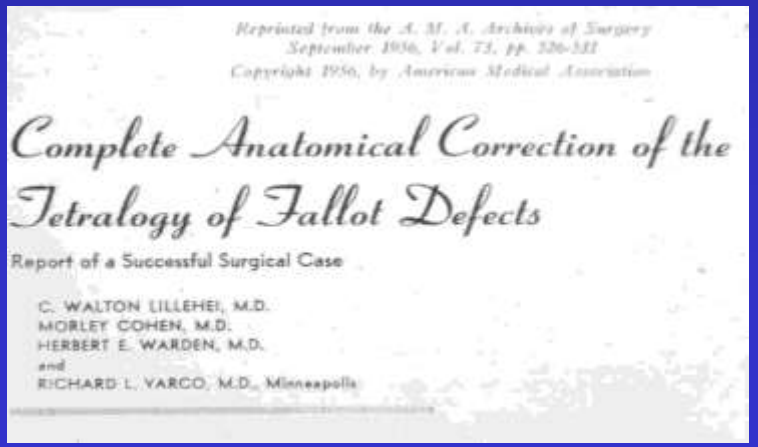
- 19 month old boy
- Tetralogy of Fallot
- Oxygenator: father
- patients 2, 3, 5 and 7 died (4/7 : **57%** mortality)
- potential 200% mortality

First Repair of VSD,TOF, CAVC

Walton Lillehei

Controlled Cross-Circulation 3/54-7/55

	NO.	MORT.	<2Y	MORT.
VSD	28	8 (28%)	16	6 (37%)
TOF	11	4 (36%)	5	3 (60%)
CAVC	4	3 (75%)	3	2 (67%)
IPS	2	0		
	45	15 (33%)	24	11(49%)



Reprinted from the A. M. A. Archives of Surgery
September 1956, Vol. 73, pp. 526-531
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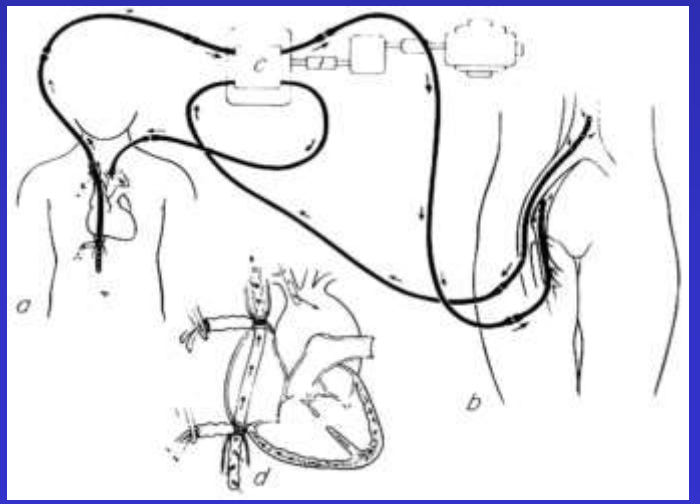
Complete Anatomical Correction of the Tetralogy of Fallot Defects

Report of a Successful Surgical Case

C. WALTON LILLEHEI, M.D.
MORLEY COHEN, M.D.
HERBERT E. WARDEN, M.D.
and
RICHARD L. VARCO, M.D., Minneapolis



First Repair of Complex CHD with CPB 1955

- In 1955 the first successful intra-cardiac repair with a pump oxygenator was performed by John W. Kirklin at the Mayo Clinic

OPERACE V MIMOTĚLNÍM OBĚHU

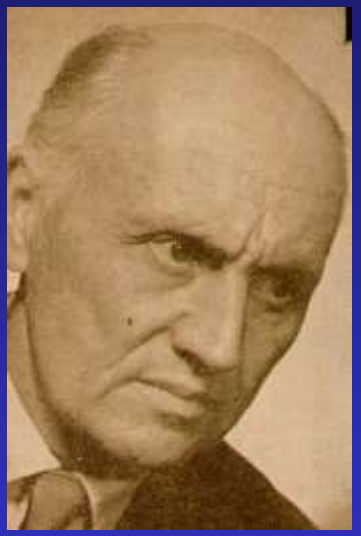
Jan Navrátil

Brno
1958

Jaroslav Procházka

Hradec Králové
1958

Václav Kafka



Praha
1960

KARDIOCHIRURGIE V BRNĚ

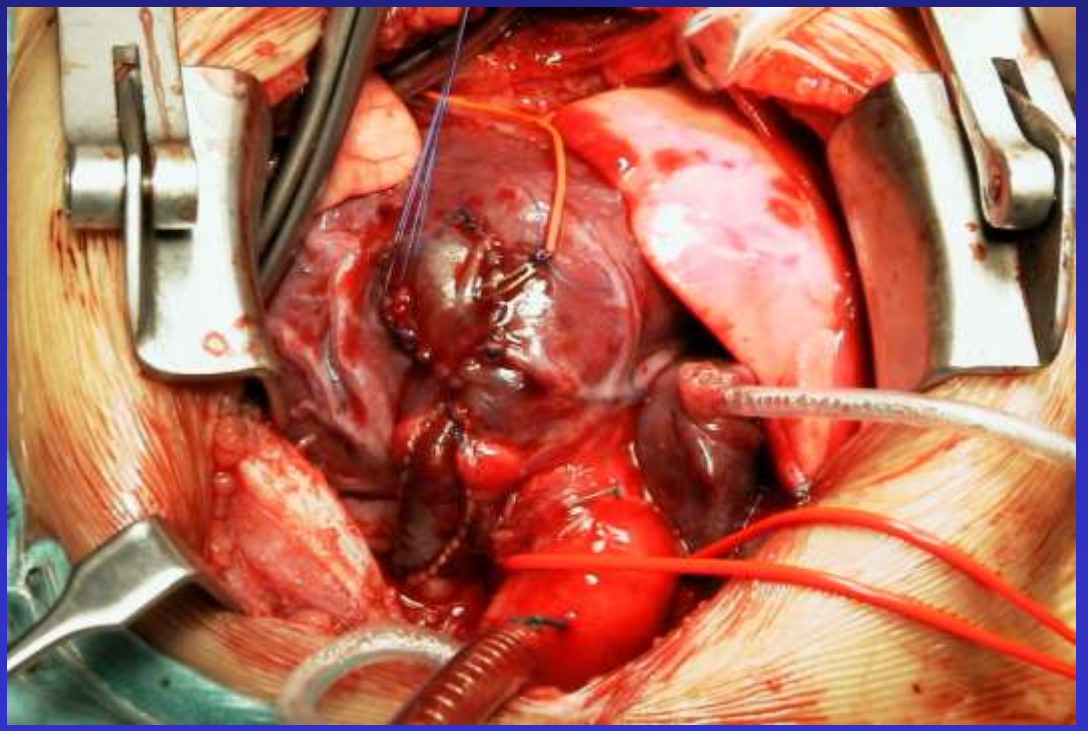
Jan Navrátil 1952-67, II.chirurgická klinika brněnské fakultní nemocnice

Vrozené a získané srdeční vady na zavřeném a otevřeném srdci. Mitrální stenoza 1953. První operace na otevř. srdci v hypotermii 1956, v mimotělním oběhu v r. 1958. Fallotova tetralogie 1961. Mechanická chlopeň 1965. Mechanická podpora a vývoj mech. srdce 1967 s Janem Vašků. Odchod do Vídně 1967 na II. chir. kliniku v Algem. Krankenhaus.

TOF Repair

M. Brodsky 1963 Praha (DCH)
B. Hucin 1978 Praha (pat. 6 years)

Jan Navrátil 1961 Brno



PEDIATRICKÁ KARDIOCHIRURGIE V PRAZE

Milan Brodský **1962 kavopulmonální spojka podle Glenna**

Jaroslav Stark a Bohumil Hučín

1967 zahájili program kardiochirurgických operací kojenců. J.Stark odejel v r. 1968 do Londýna. Od r. 1974 vedoucí kardiochirurgický konzultant v Hospital for Sick Children v Great Ormond Street.

IAA First One Stage Repair

- Barratt-Boyes et al. 1972

Aortic arch interruption associated with patent ductus arteriosus, ventricular septal defect, and total anomalous pulmonary venous connection

Total correction in an 8-day-old infant by means of profound hypothermia and limited cardiopulmonary bypass

Brian G. Barratt-Boyes, M.B., Ch.M., F.R.A.C.S., Trevor T. Nicholls, M.B., F.R.C.S., Peter W. T. Brandt, M.B., Ch.B., F.F.R., and John M. Neutze, M.D., M.R.A.C.P., Auckland, New Zealand

Aortic arch interruption is an uncommon vascular malformation frequently associated with intracardiac anomalies.[1-3] As the majority of infants with this condition die within the first month of life,[1, 4] surgery must be directed to this age group and should include correction of the intracardiac anomalies.

This presentation describes a technique of repair that is applicable to the neonate and reports the first successful complete correction of an aortic interruption and its associated complex intracardiac abnormalities in an 8-day-old infant.

From the Cardiothoracic Surgical Unit, Green Lane Hospital, Auckland, New Zealand.
Received for publication Sept. 2, 1971.

Case report

A full-term part-Maori female baby was referred to Green Lane Hospital at the age of 5 days because of intermittent cyanotic attacks and a rapid respiratory rate. Examination revealed an active, normally alert child with slight cyanosis and a respiratory rate of 70 breaths per minute. Generalized hypotonia, accessory auricular skin tags, and anal atresia with a fistula opening to the fourchette were also noted.

The pulses were of small volume, but the femoral pulses were palpable. Crepitations were present throughout both lung fields, and the liver extended 3 cm. below the right costal margin. On auscultation, there was an ejection click and a Grade 1 of 6 parasternal systolic murmur; the two elements of the second sound were difficult to separate. The chest x-ray film showed mild cardiomegaly with pulmonary plethora, and the electrocardiogram demonstrated a mean frontal axis of +140 degrees with probable right ventricular

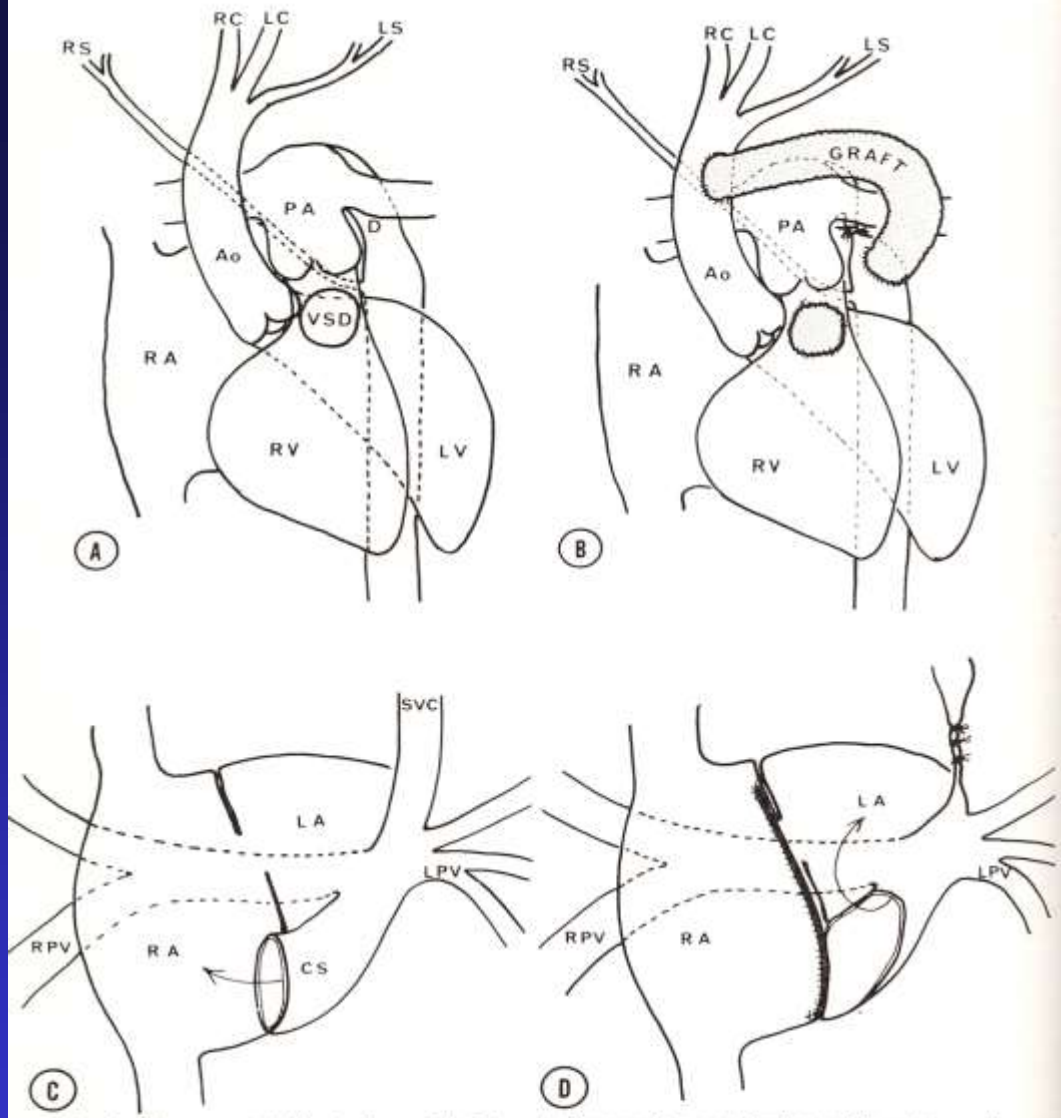


Fig. 4. Diagrammatic illustration of defects. *A*, Preoperative ventriculoarterial anatomy. *B*, Postoperative ventriculoarterial anatomy. The Dacron graft connects the ascending aorta to the descending aorta, the ductus is ligated, and the ventricular septal defect is closed with a Teflon patch. The graft is not to scale, as it was approximately twice the diameter of the patient's aorta. *C*, Preoperative venoatrial anatomy. The secundum atrial septal defect is not labeled. *D*, Postoperative venoatrial anatomy. The coronary sinus now opens into the left atrium. A large patch closes the atrial septal defect and right atrial connection of coronary sinus. The left superior vena cava has been ligated. *Ao*, Ascending aorta. *RS*, Aberrant right subclavian artery. *RC*, Right carotid artery. *LC*, Left carotid artery. *LS*, Left subclavian artery. *PA*, Main pulmonary artery. *D*, Patent ductus arteriosus. *RV*, Right ventricle. *LV*, Left ventricle. *VSD*, Supracristal ventricular septal defect. *RPV*, Right pulmonary vein. *LPV*, Left pulmonary vein. *RA*, Right atrium. *LA*, Left atrium. *CS*, Coronary sinus. *LSVC*, Left superior vena cava.

IAA First One Stage with Direct Anastomosis 1975

Interrupted aortic arch and ventricular septal defect

Direct repair through a median sternotomy incision in a 13-day-old infant

A type B interrupted aortic arch was successfully repaired in a 13-day-old infant during profound hypothermia and circulatory arrest. Through a median sternotomy incision it was possible to resect a patent ductus arteriosus and mobilize the descending thoracic aorta for anastomosis to the side of the ascending aorta. At the same time a large ventricular septal defect (VSD) and a small atrial septal defect were closed through the right atrium. Cardiac catheterization 5 months after operation showed a small persistent VSD with a pulmonary to systemic blood flow ratio of 1.1/1. The systolic gradient between the ascending and descending aorta was 20 mm. Hg.

G. A. Trusler, M.D., and T. Izukawa, M.D., *Toronto, Ontario, Canada*

Interrupted aortic arch is a complex malformations of which ventricular septal defect (VSD) is the commonest. Since affected infants develop cardiac failure soon after birth and most die within the first month, early treatment is imperative. Both the intracardiac defect and the interrupted aortic arch should be repaired.

This report describes repair with the use of profound hypothermia and circulatory arrest of both a type B interrupted aortic arch and a VSD in a 13-day-old infant. Through a median sternotomy it was possible to mobilize the descending aorta sufficiently that it could be anastomosed directly to the side of the ascending aorta.

Case report

The patient, a girl, was delivered by cesarian section at 38 weeks' gestation. On the second day of life, she developed cyanotic attacks and respiratory distress.

On admission to The Hospital for Sick Children, Toronto, on June 9, 1973, she was pink and in severe cardiac failure with gross hepatomegaly and râles throughout both lung fields. Her peripheral pulses were impalpable. The right ventricular impulse was prominent at the left sternal border. A gallop rhythm was audible at the lower left sternal border. An initially soft midsystolic murmur, heard at the lower left sternal border, subsequently became louder and longer.

The AP and lateral roentgenograms of her chest revealed cardiomegaly with a cardiothoracic ratio of 67 per cent and increased vascular markings in the lung fields. Right axis deviation (+180°) and right ventricular hypertrophy were noted on the electrocardiogram.

Cardiac catheterization (Table I) identified an atrial septal defect, VSD, patent ductus arteriosus, and an interruption of the aortic arch between the left common carotid and left subclavian arteries (Fig. 1). The right subclavian artery was aberrant, arising from the upper end of the descending aorta, close to the origin of the left subclavian artery.

The heart failure improved after the administration of furosemide and digoxin. However, the infant was found to have hypocalcemia which was resistant to intravenous or oral calcium. Magnesium levels were also low. The administration of

From the Departments of Surgery and Cardiology, The Hospital for Sick Children, and the University of Toronto, Toronto, Canada.

Received for publication June 7, 1974.

Address for reprints: G. A. Trusler, M.D., The Hospital for Sick Children, 555 University Ave., Toronto, Ontario M5G 1X8, Canada.

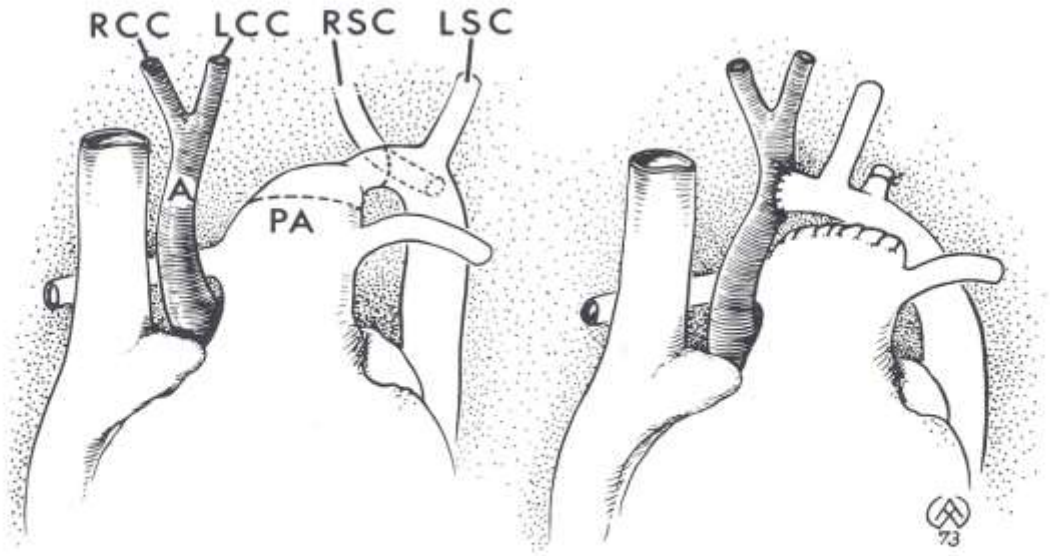


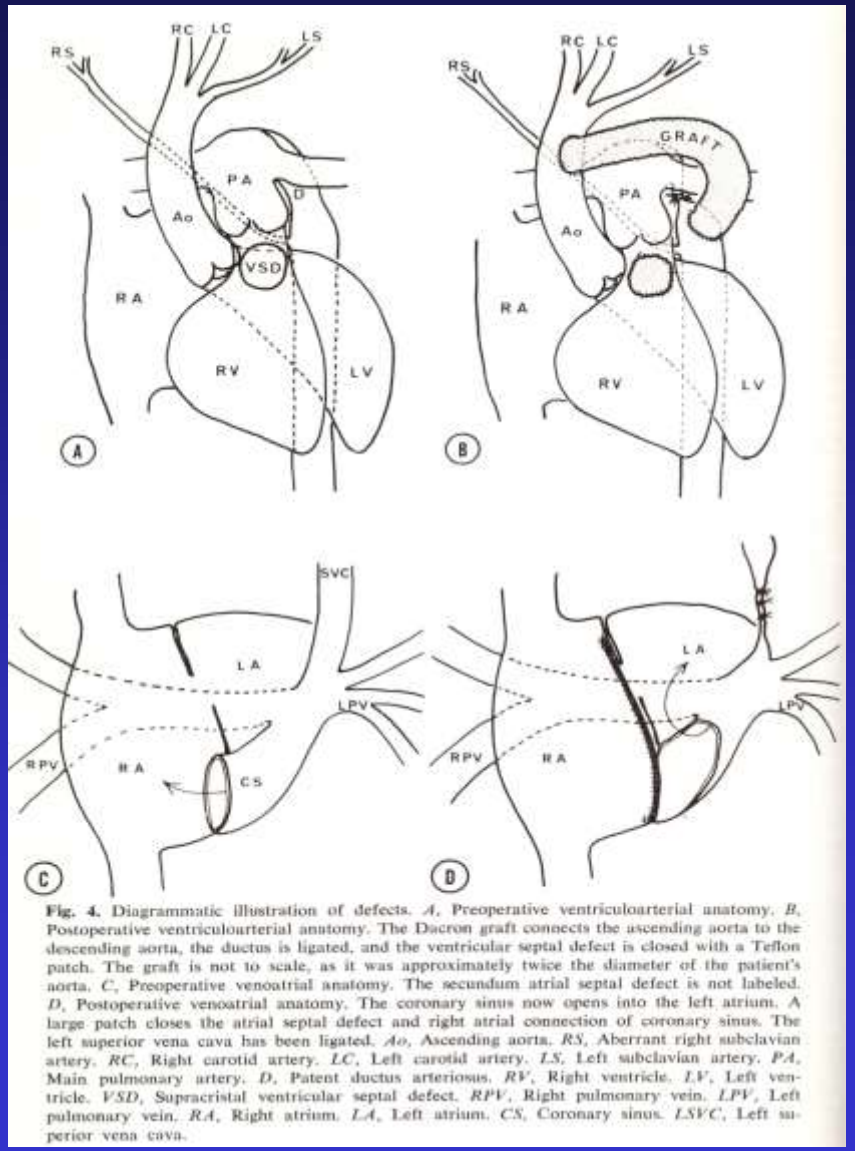
Fig. 2. Diagram of the interrupted aortic arch and its repair. The patent ductus arteriosus was excised, the aberrant right subclavian artery divided, and the proximal end of the descending aorta then anastomosed to the side of the ascending aorta. *A*, Ascending aorta; *PA*, pulmonary artery; *RCC*, right common carotid artery; *LCC*, left common carotid artery; *RSC*, right subclavian artery; *LSC*, left subclavian artery.

Trusler et al. 1975

IAA Arch Reconstruction with PAB 1973

- B. Hucin

Pat. 18 month



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PEDIATRICKÝ KARDIOCHIRURGICKÝ PROGRAM V PRAZE

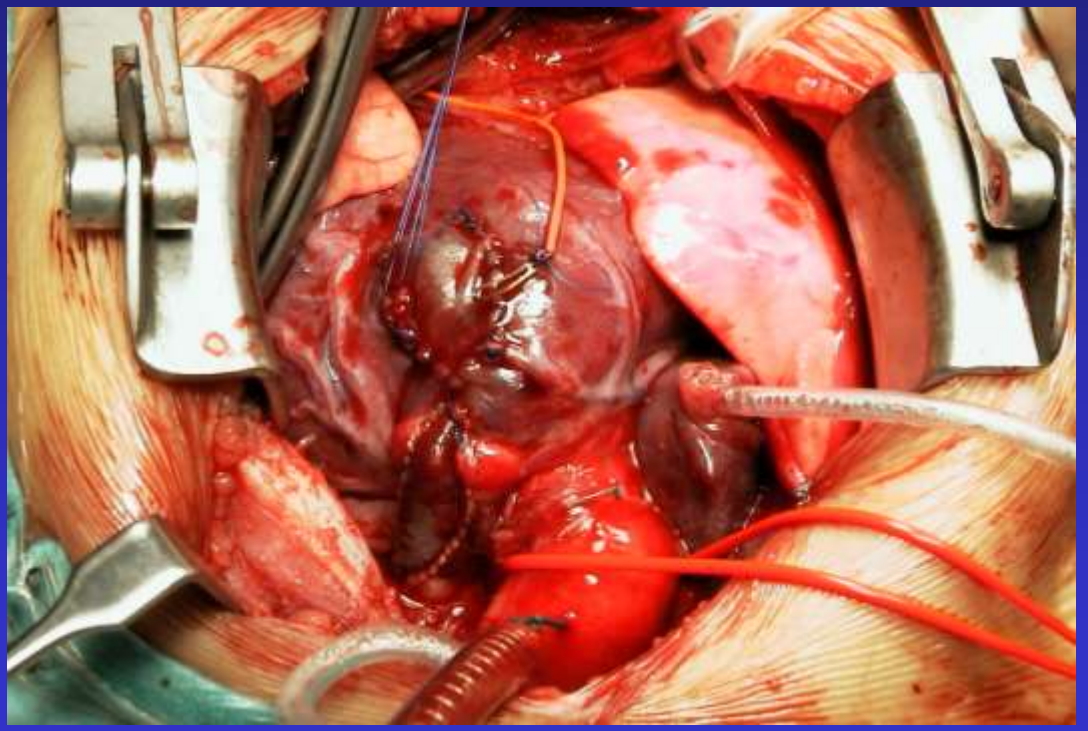
Pediatrické kardiocentrum ve FN v Motole v r.1977

(SPPKK - Specializované pracoviště pediatrické kardiologie a kardiochirurgie).

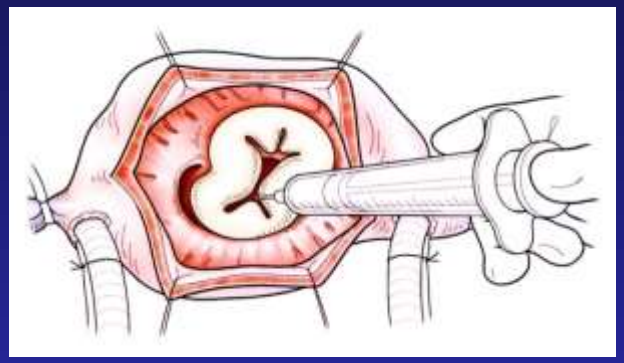
Vedoucím kardiochir. pracoviště Bohumil Hučín. Nový program časné korekce srdečních vad u novor. a kojenců a rekonstrukční operace komplexních srd. vad u starších dětí, operace kojenců na otevř. srdci v hluboké hypotermii se zástavou cirkulace, celostátní program péče o děti s vrozenou srdeční vadou, prenatální ultrazvukový screening srdečních vad, centralizovaná péče a dlouhodobé sledování vývoje pacientů do dospělosti.

TOF Repair Prague Motol 1978

B. Hucin (pat. 6 years)

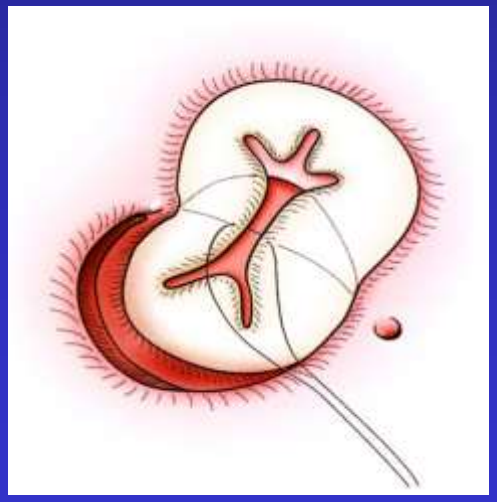


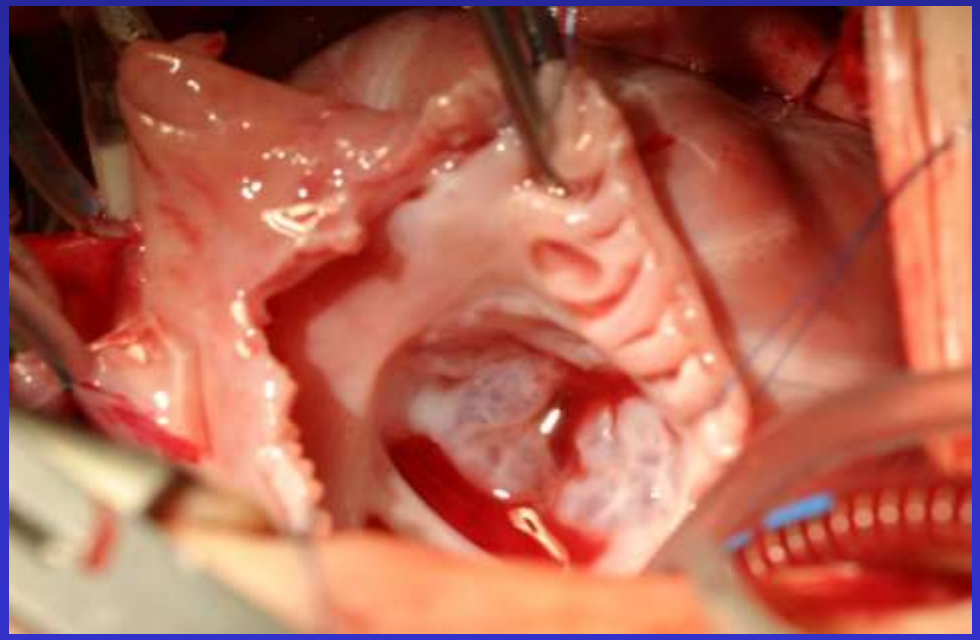
cAVSD Repair Prague Motol 1979



B. Hucin

pat. 18 month

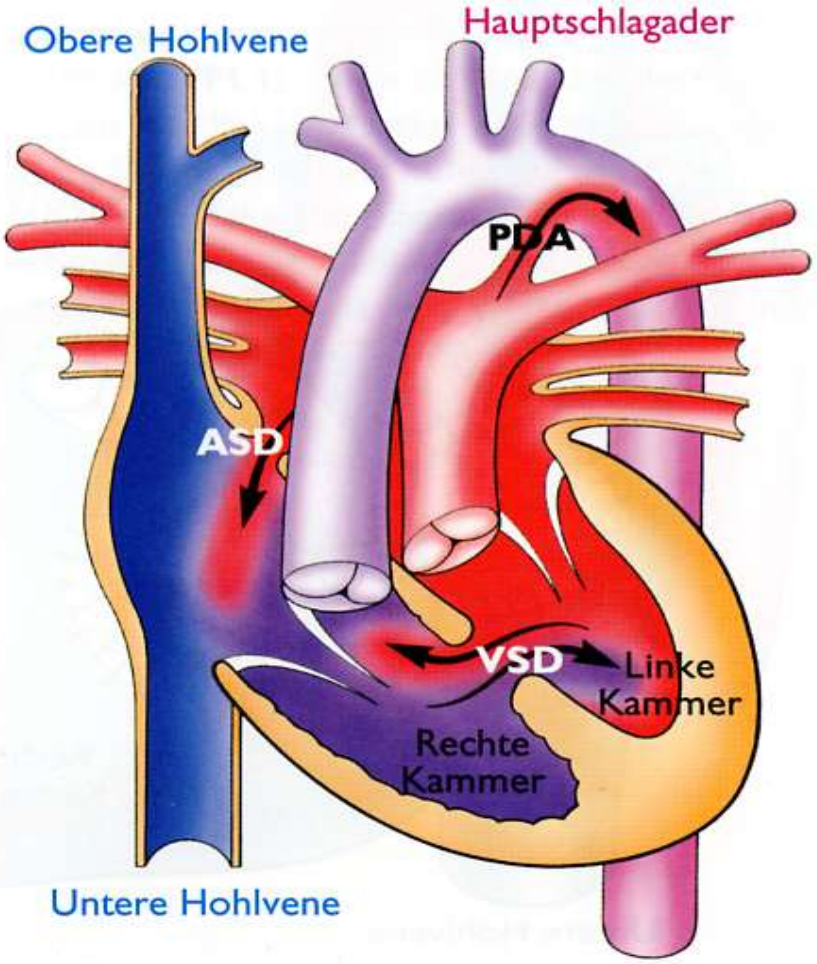




PTA Repair History

1963 - Herbert Sloan, University of Michigan
PTA repair with non valved conduit
1967 – Rastelli, Mc Goon, Mayo Clinic
PTA repair with valved PA homograft
1976 – Paul Ebert, UCSF
PTA repair with Hancock 12 mm
1981 – Bohumil Hucin, Prague (pat. 15 month)
1985 – Jonas, Castaneda, Boston
PTA repair with aortic homograft
1990 – Ed Bowe, University of Michigan
PTA repair at neonatal age

The History of TGA Treatment



Cyanotic CHD:

1.) PDA

2.) PFO/ASD

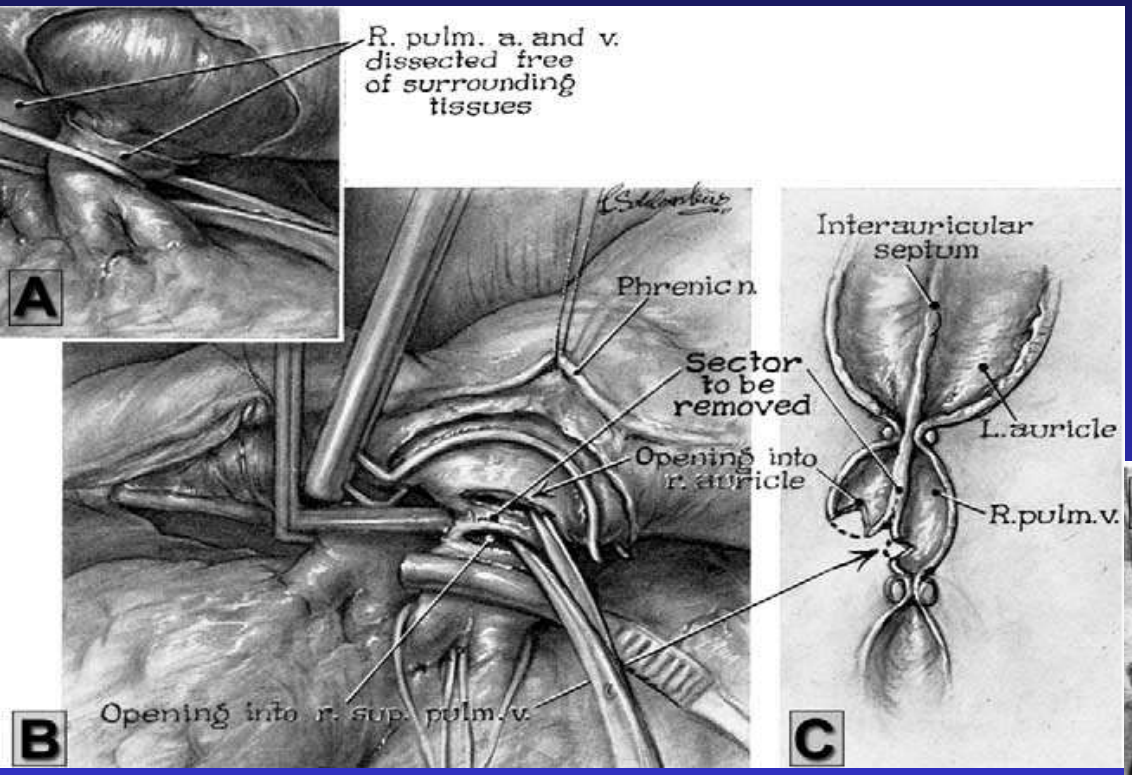
(Rashkind)

3.) VSD

Surgery:

- Atrial Switch
- Arterial Switch

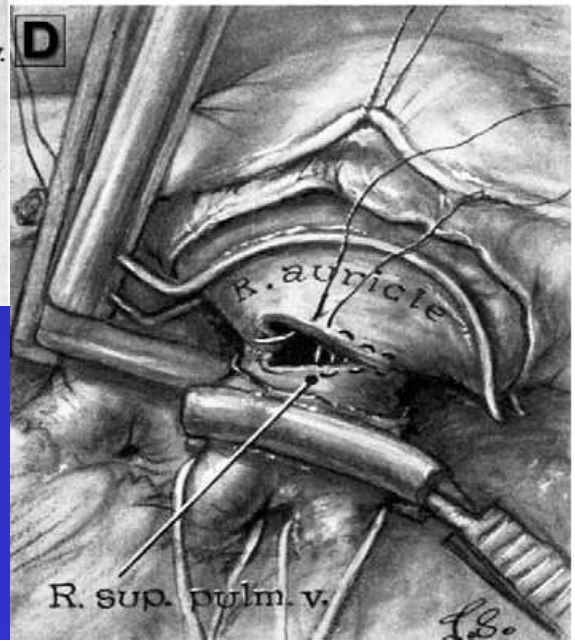
Blalock-Hanlon Operation 1950

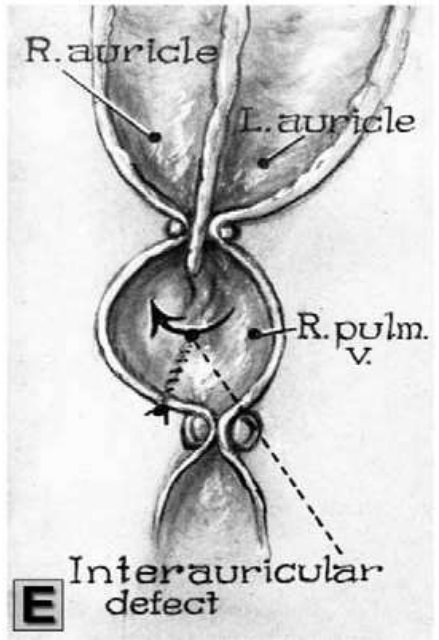


Alfred Blalock

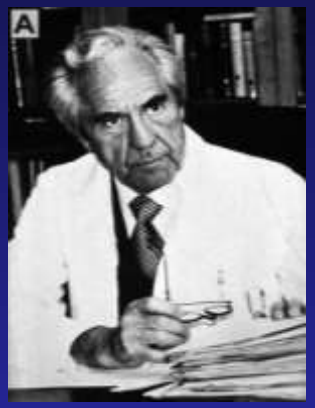
Rollins Hanlon

- atrial septectomy





TGA First Atrial Repair 1957



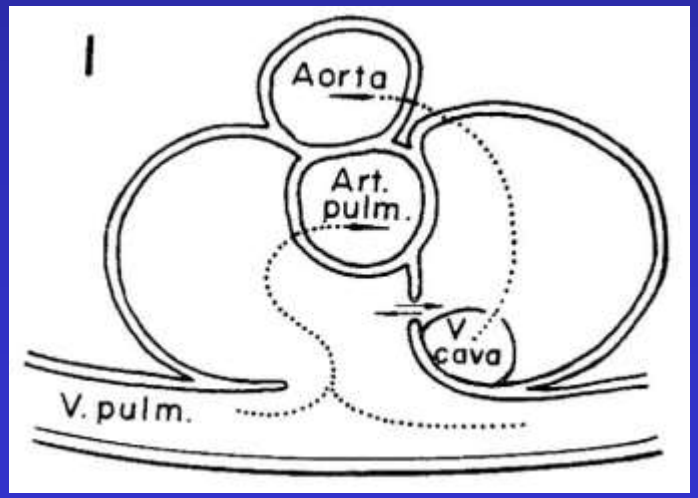
Ake Senning

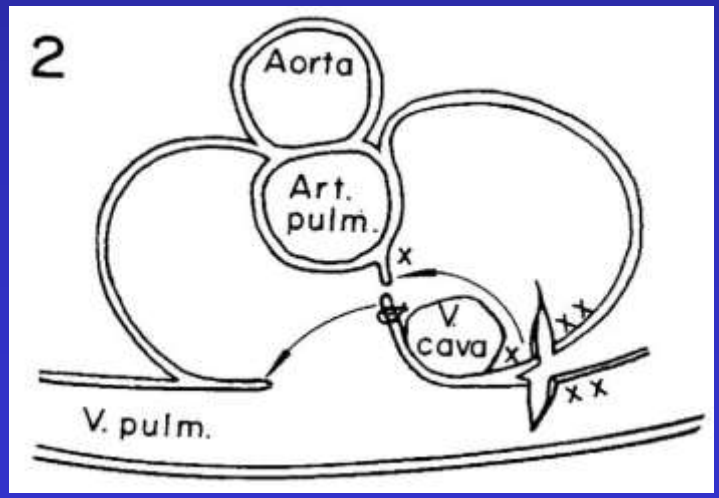
SURGICAL CORRECTION OF TRANSPOSITION OF THE GREAT VESSELS

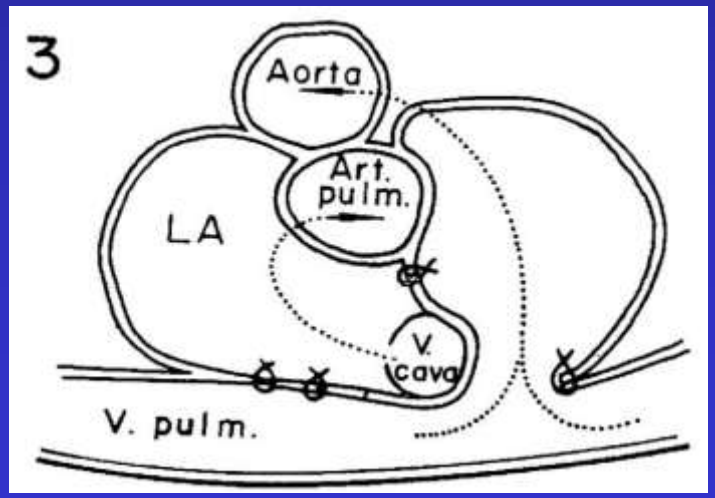
ÅKE SENNING, M.D., STOCKHOLM, SWEDEN

(From the Thoracic Clinic, Karolinska Sjukhuset, and the Department of Experimental Surgery, Karolinska Institutet)

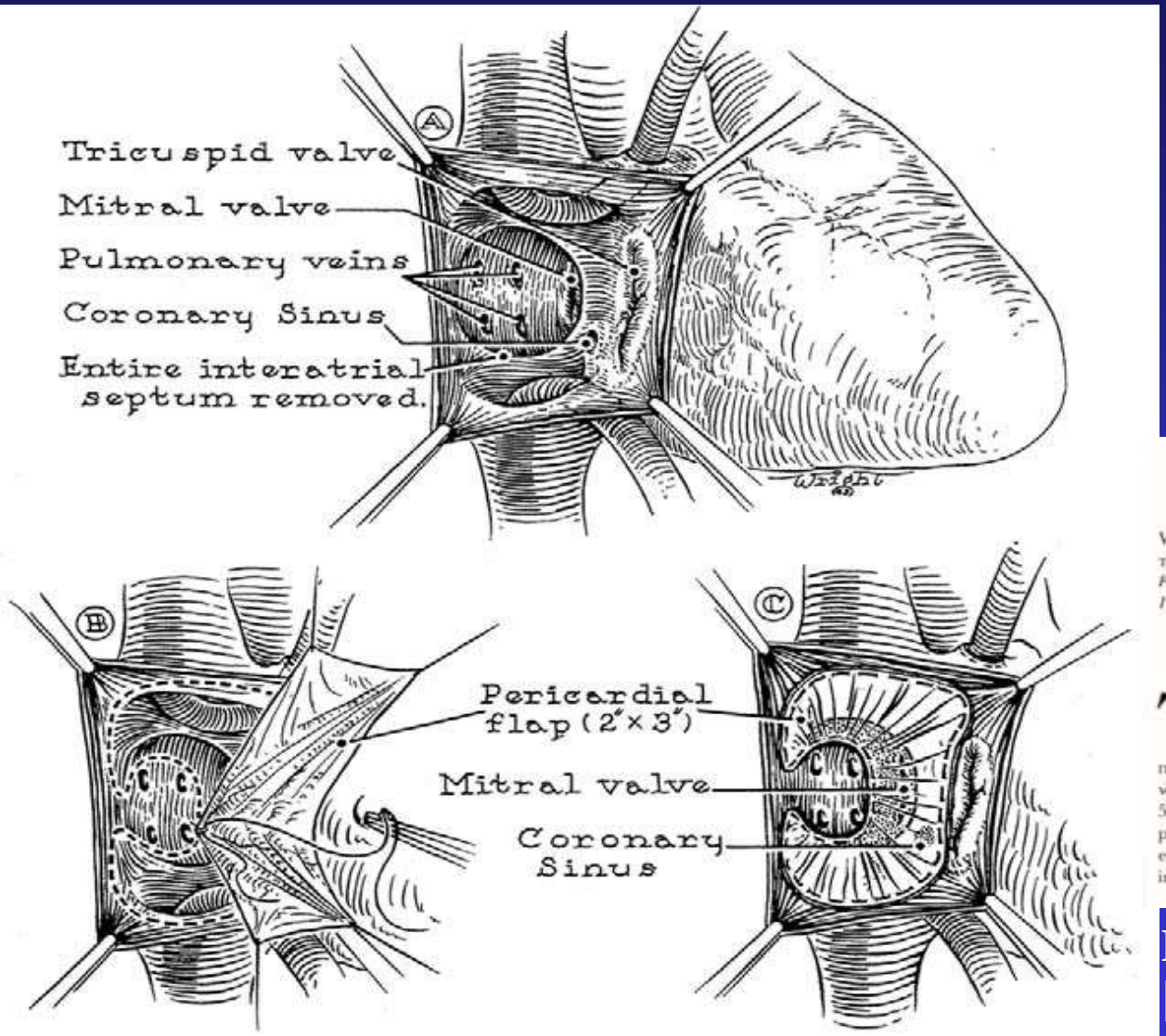
TRANSPOSITION of the great vessels is a congenital heart malformation which causes cyanosis, with about the same incidence as tetralogy of Fallot. It is one of the most common anomalies which cause death during the first period of life. In complete transposition, the aorta emanates from the







Atrial Repair of TGA Mustard Operation 1963



William Mustard

Successful two-stage correction of transposition of the great vessels

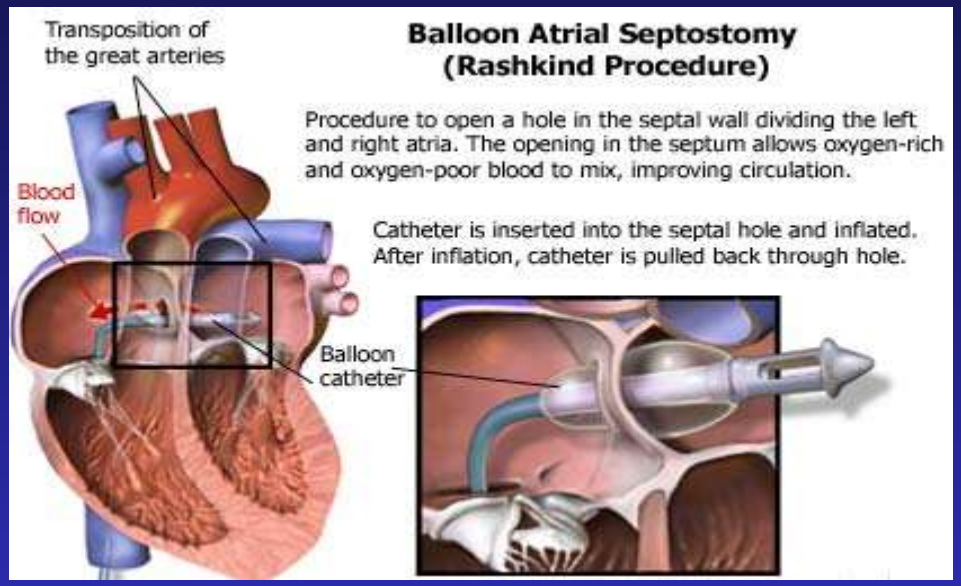
W. T. MUSTARD, M.D.
TORONTO, ONTARIO, CANADA
From the Department of Surgery and Research Institute, Hospital for Sick Children

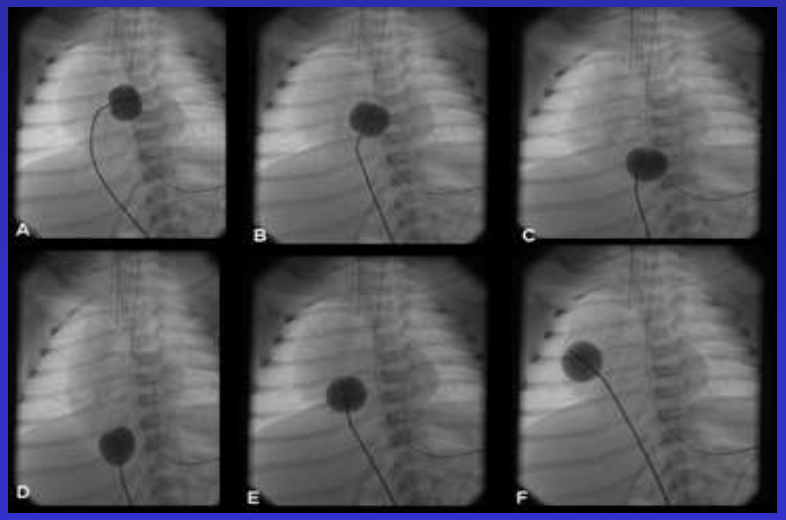
Transposition of the great vessels is the most common cause of death in infants born with congenital heart disease.[6] Furthermore, 52 percent die within the first month and 86 percent are dead within 6 months.[3] If one excludes the unusual fortunate child surviving the first year of life, it is evident that

Baby girl J. M. was born on June 1, 1961, with a birth weight of 7 pounds, 6 ounces. The child was cyanosed at rest, a symptom which became more remarkable when she was crying or taking feedings. She was admitted to the Hospital for Sick Children on June 12.

Mustard WT, Surgery; 1964;55:469–72 [25]

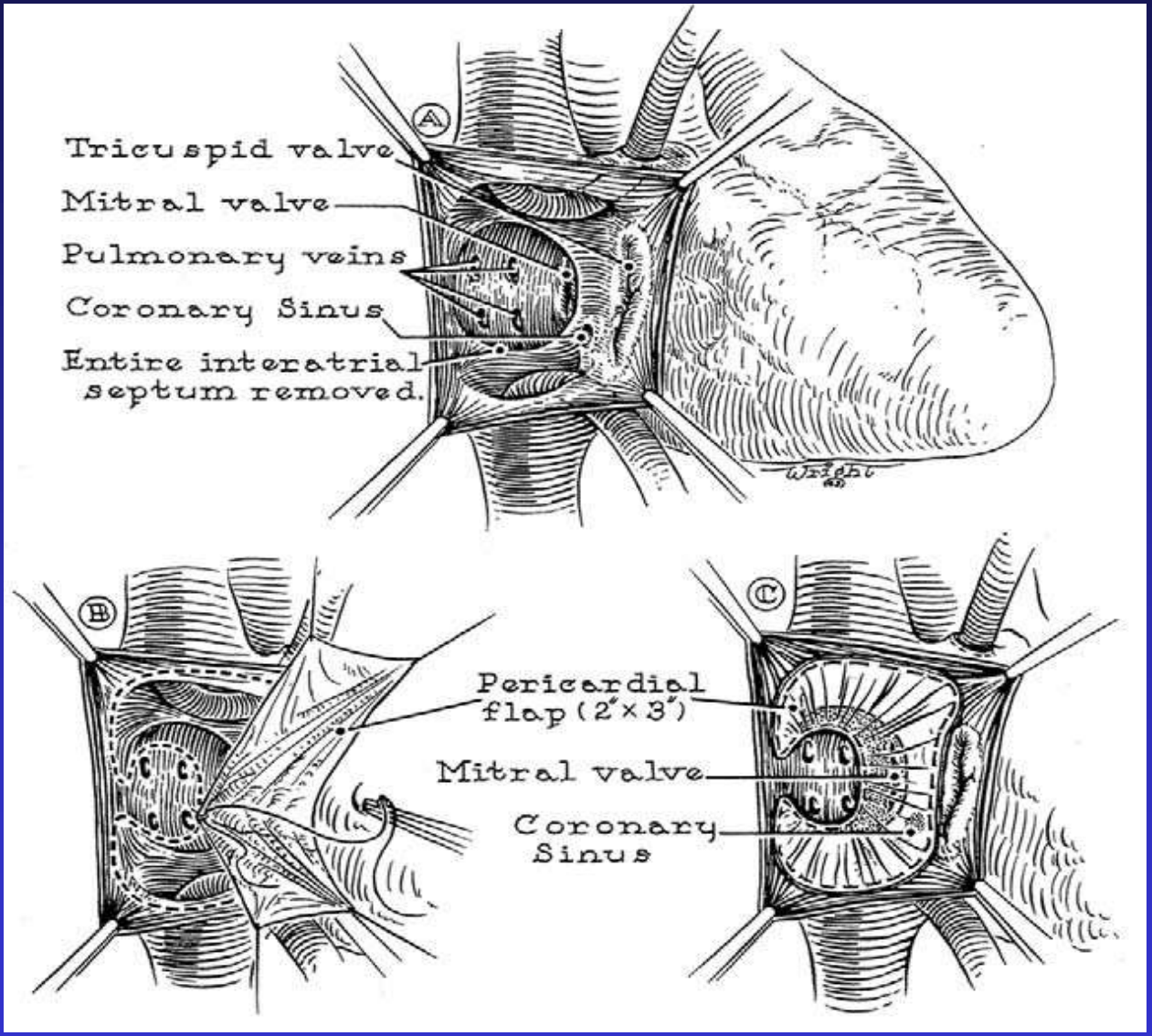
The First Balloon Atrial Septostomy 1966





W. Rashkind

Atrial Repair of TGA Mustard Operation



Dr. Uhlir 1974 Brno
B. Hucin 1979 Praha

(pat. 6 month)

Atrial Repair of TGA Senning 1984

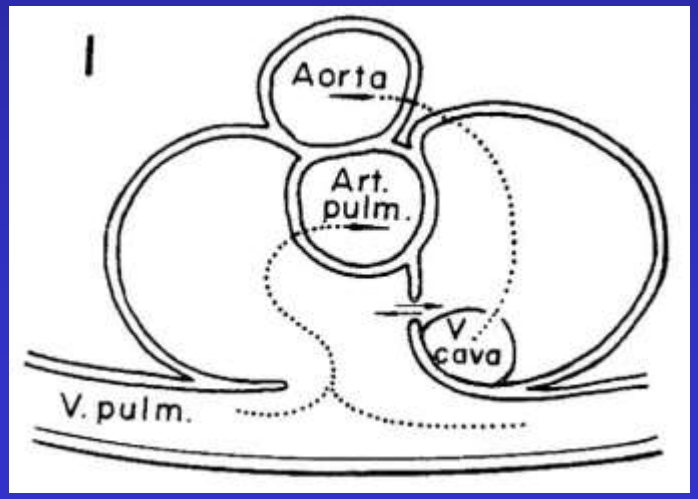
SURGICAL CORRECTION OF TRANSPOSITION OF THE GREAT VESSELS

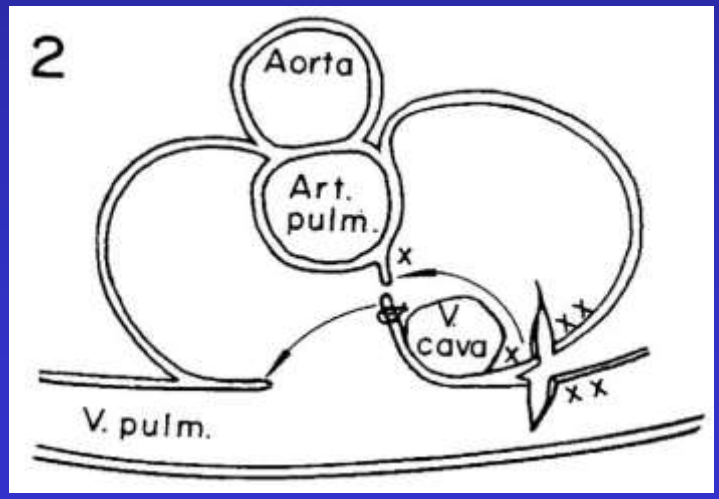
ÅKE SENNING, M.D., STOCKHOLM, SWEDEN

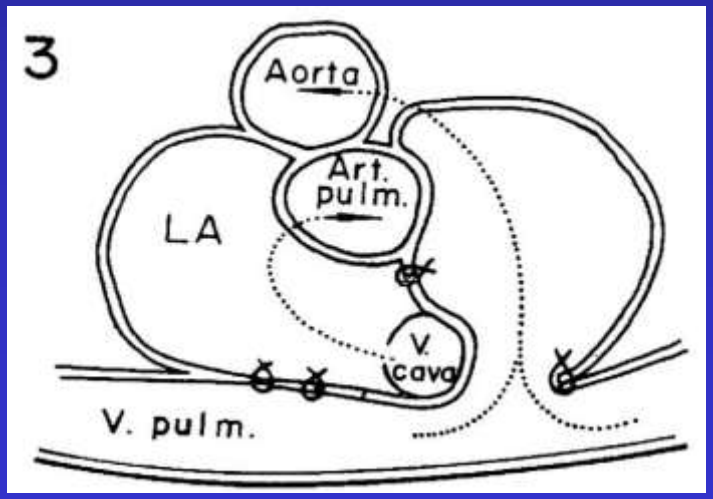
(From the Thoracic Clinic, Karolinska Sjukhuset, and the Department of Experimental Surgery, Karolinska Institutet)

TRANSPOSITION of the great vessels is a congenital heart malformation which causes cyanosis, with about the same incidence as tetralogy of Fallot. It is one of the most common anomalies which cause death during the first period of life. In complete transposition, the aorta emanates from the

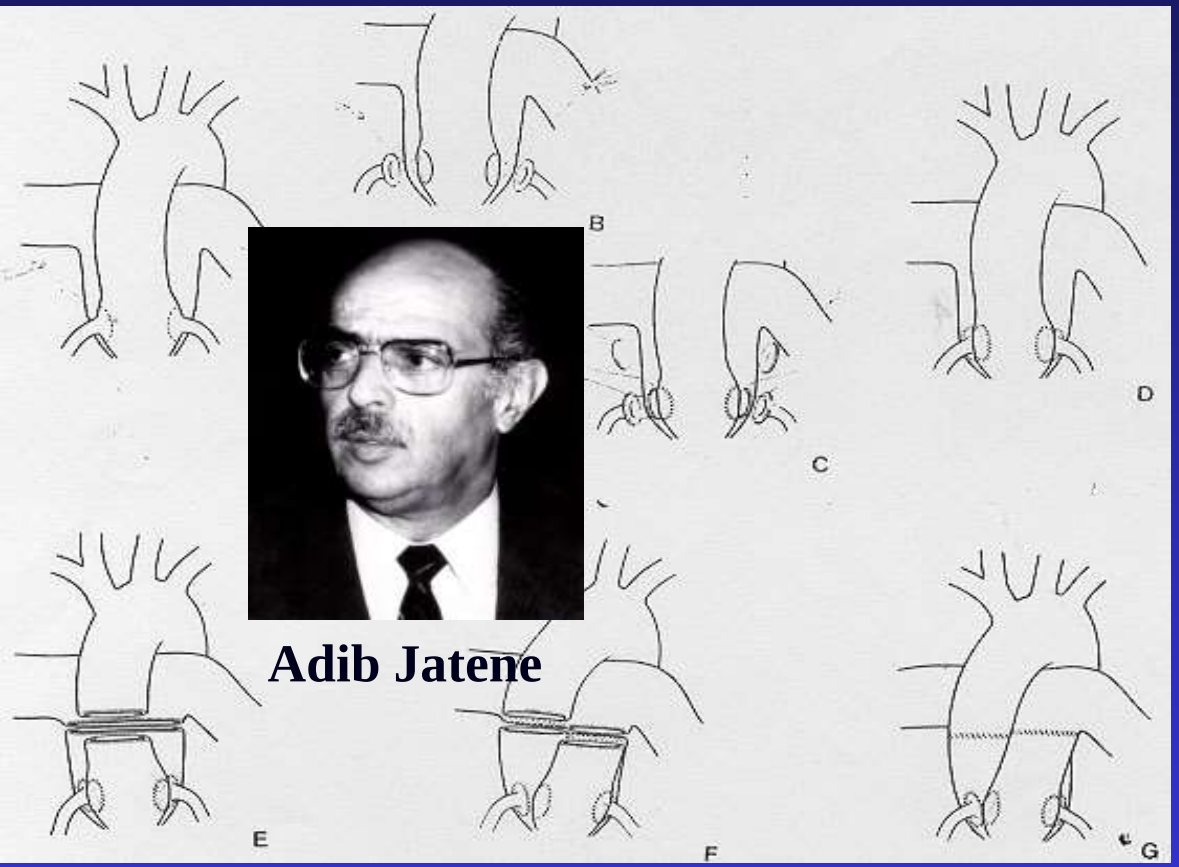
(pat. 15 month)







Arterial Repair of TGA
Jatene Switch Operation Child 1975



Adib Jatene

Anatomic correction of transposition of the great vessels

We present a new approach for anatomic correction of transposition of the great arteries. The two coronary arteries, with a piece of the aortic wall attached, are transposed to the posterior artery. The two aortic openings are closed with a patch. The aorta and pulmonary artery are transected, contraposed, and then anastomosed. The interventricular septal defect is closed with a patch, through a right ventriculotomy approach, because the right ventricle is no longer part of the systemic circulation. Two patients, aged 3 months and 40 days and weighing 4,200 and 3,700 grams, respectively, were operated upon with deep hypothermia and total circulatory arrest. There was good recovery from the operation, with normal cardiocirculatory conditions. Renal failure developed in the first patient, and she died on the third postoperative day. During this time the cardiocirculatory conditions were good. The second patient made an uneventful recovery. Hemodynamic studies 20 days after the operation showed complete correction of the malformation. Five and one-half months after the operation, he weighs 7,500 grams, and his development is very good. We believe that this operation will be reproducible by most cardiovascular surgeons and will be an alternative to the Mustard procedure, especially for those patients with interventricular septal defect and pulmonary hypertension.

Adib D. Jatene, M.D. (by invitation), V. F. Fontes, M.D. (by invitation), P. P. Paulista, M.D. (by invitation), L. C. B. Souza, M.D. (by invitation), F. Neger, M.D. (by invitation), M. Galantier, M.D. (by invitation), and J. E. M. R. Sousa, M.D. (by invitation), *São Paulo, Brazil*
Sponsored by E. J. Zerbini, M.D., *São Paulo, Brazil*

SUCCESSFUL ANATOMIC CORRECTION OF TRANSPOSITION OF THE GREAT VESSELS. A PRELIMINARY REPORT
Arq. bras. Cardiol. ; 1975; 4: 461-464 [28]

ANATOMIC CORRECTION OF TRANSPOSITION OF THE GREAT VESSELS
J Thorac Cardiovasc Surg;1976; 72: 364-370

Arterial Switch + VSD Operation Infant 1976

Anatomical correction of complete transposition of the great arteries and ventricular septal defect in infancy

M H YACOUB, R RADLEY-SMITH, C J HILTON

British Medical Journal, 1976, **1**, 1112-1114

Summary

Two patients, aged 8 weeks and 5 years, with D transposition of great arteries and large ventricular septal defect were treated by transection of both aorta and pulmonary arteries and reattaching them to the appropriate ventricles. This included the origins of the coronary arteries. The ventricular septal defect was closed through a transverse ventriculotomy using a Dacron patch. The younger child was operated on as an emergency because of cyanosis and severe heart failure resistant to intensive medical treatment. The older child had had previous banding of the pulmonary artery at the age of 1 year. In both patients pulmonary artery pressure dropped to below half systemic pressure immediately after the operation. Postoperative progress was satisfactory with relief of cyanosis and heart failure. Early anatomical correction of transposition of the great arteries and ventricular septal defect is feasible and should play an important part in the management of these patients.

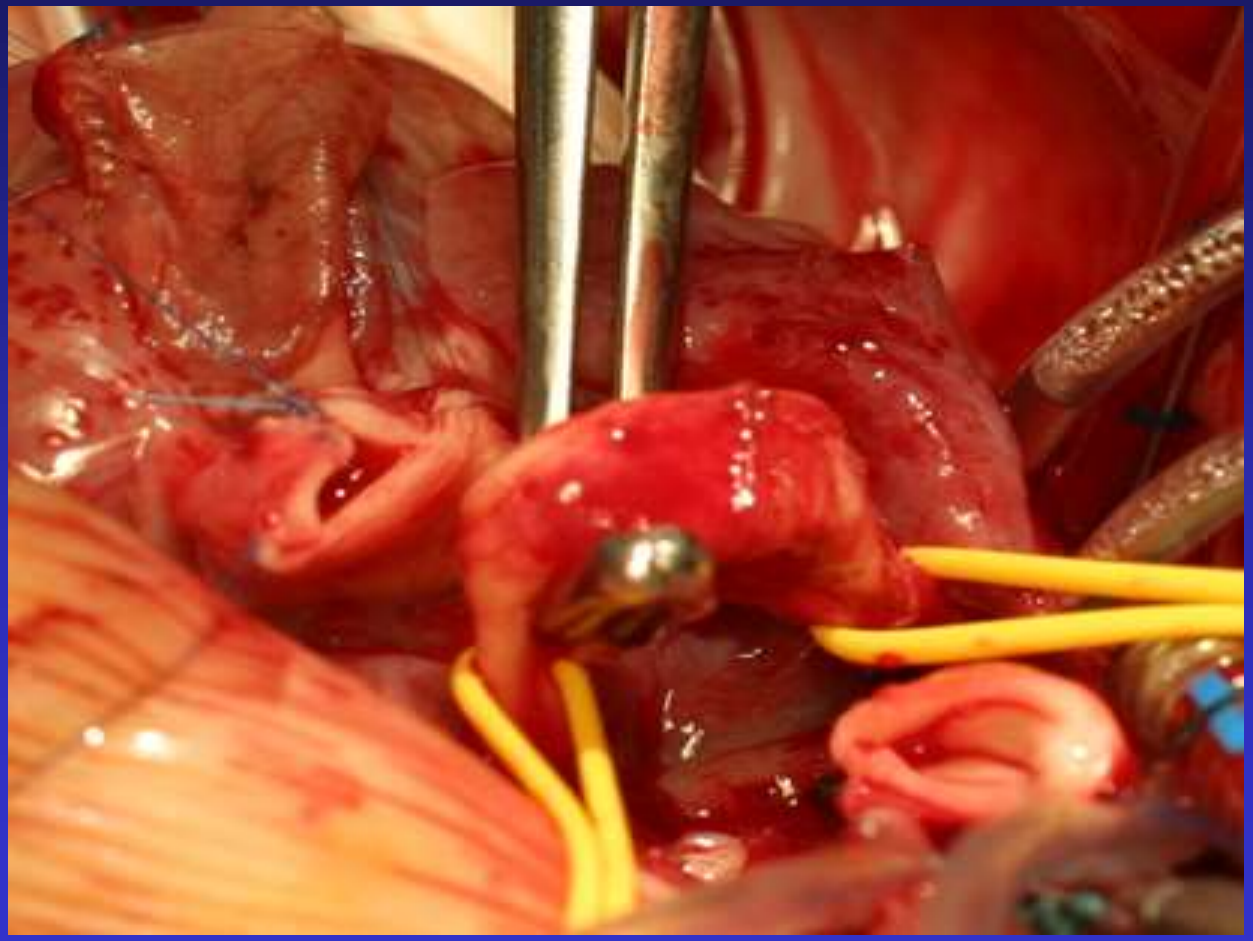
months with progressive cyanosis and tachypnoea. In spite of full medical treatment (digitalis and diuretics) his respiratory rate was 80/minute, his liver was palpable three fingers below the costal margin, and he required tube feeding. The chest radiograph showed increasing cardiomegaly with plethoric lung fields (fig 1). On 29 October 1975 his condition deteriorated further and it was decided that operation should be performed as soon as possible. This was performed the next day. At that time he weighed 4350 g.

Surface-induced profound hypothermia combined with cardiopulmonary bypass and circulatory arrest was used. The ascending aorta, aortic arch, and main pulmonary artery were mobilised. The ligamentum arteriosum was divided. The anteriorly placed ascending aorta was transected 3 mm above the top of the sinuses of Valsalva. The pulmonary artery, which was about twice the size of the aorta, was transected at the same level. The coronary ostia with a cuff of aortic wall about 1 mm wide were detached from the aorta and anastomosed to the corresponding sinuses of Valsalva of the pulmonary valve using 7/0 sutures. The proximal end of the pulmonary artery was then anastomosed to the distal end of the ascending aorta using 6/0 sutures. To match the size of the aorta to the large pulmonary artery the former was incised longitudinally on its posterior surface before starting the anastomosis. The defects in the aortic sinuses, produced by detachment of the coronary ostia, were then repaired using two patches of autogenous tissue (pericardium for one defect and free pulmonary arterial wall for the other). The proximal end of the aorta was then joined to the distal end of the pulmonary artery using a 10-mm Dacron graft.

Sir Magdi Yacoub

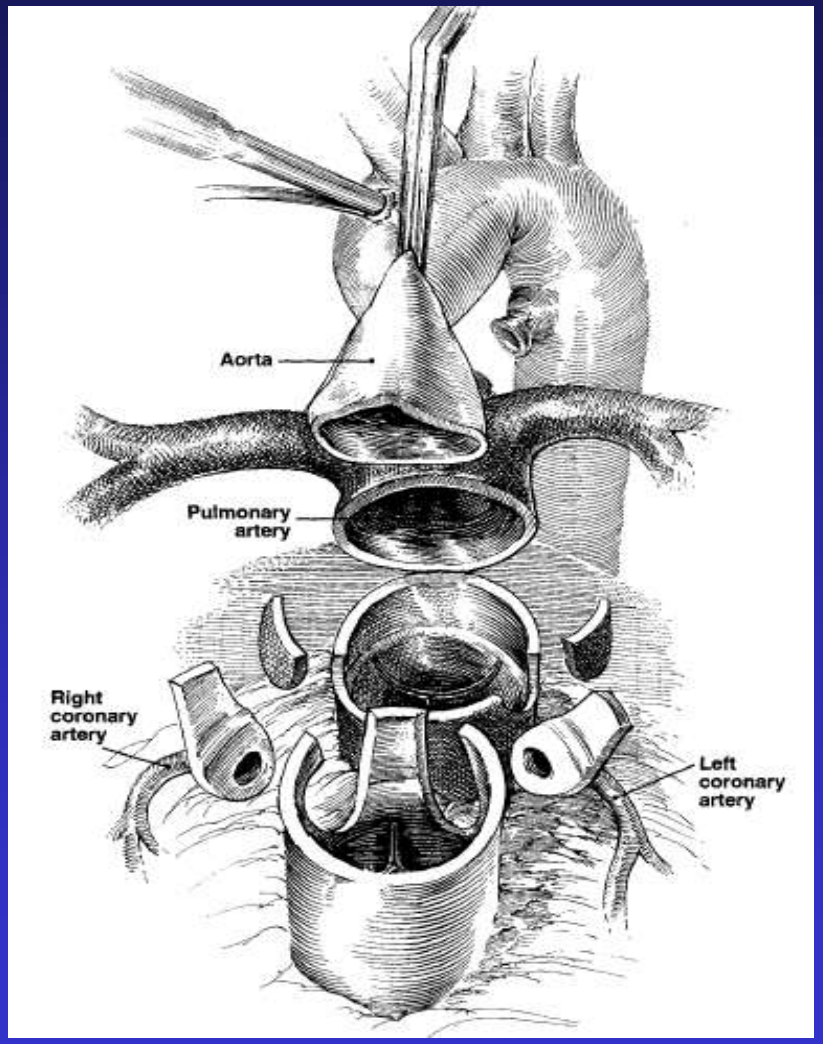
ANATOMICAL CORRECTION OF COMPLETE TRANSPOSITION OF THE GREAT ARTERIES AND VENTRICULAR SEPTAL DEFECT IN INFANCY. Br Med J. 1976 May 8;1(6018):1112-4.

Lecompte Manouver 1981



First Neonatal Switch Operation 1983

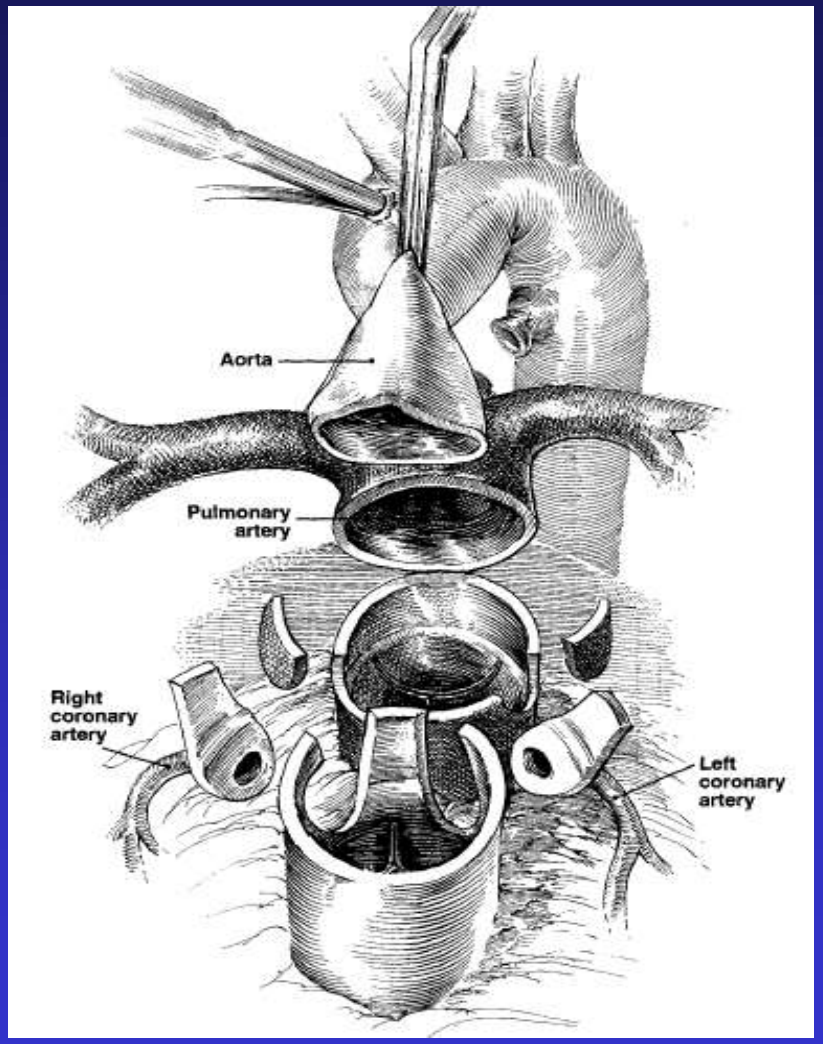
Prof. Aldo. R. Castaneda



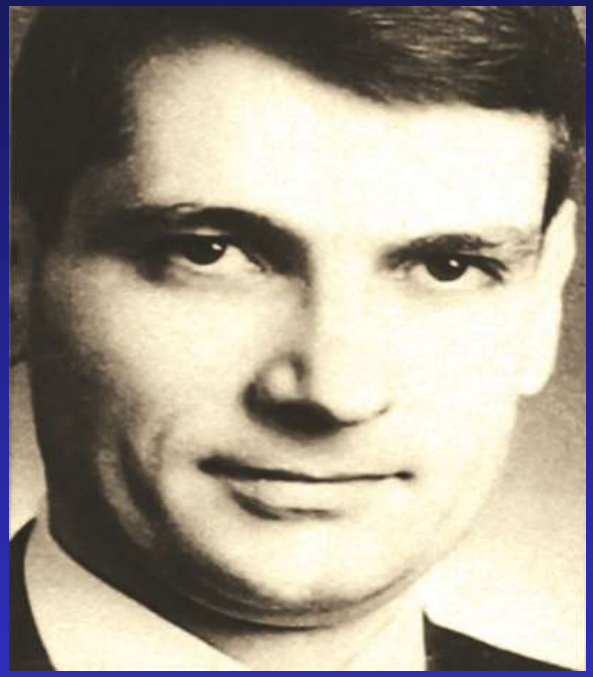
First Neonatal Switch Operation 1988

Bohumil Hucin

(pat. 8 days)



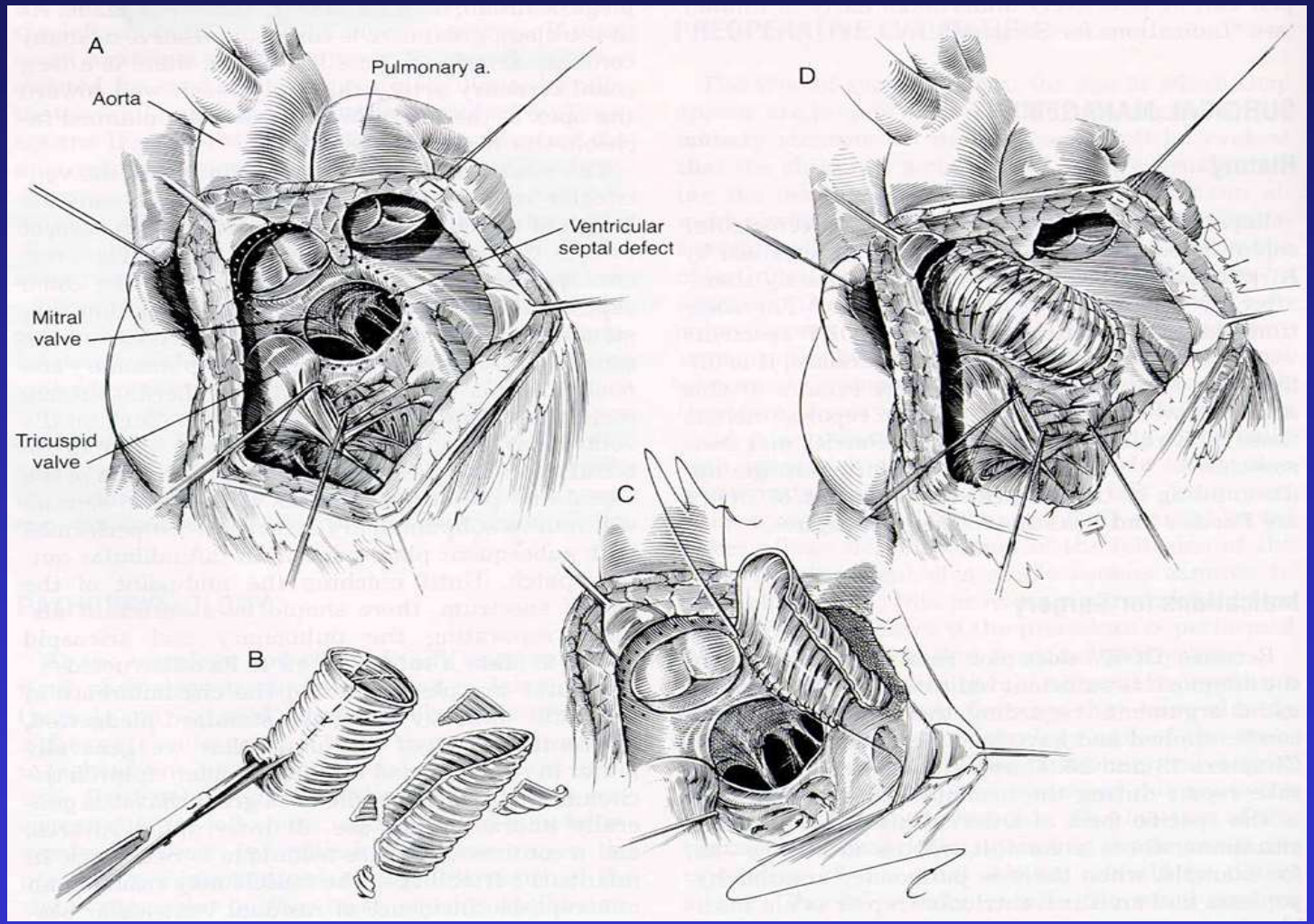
Complex TGA Repair Rastelli Operation 1967



Giancarlo Rastelli

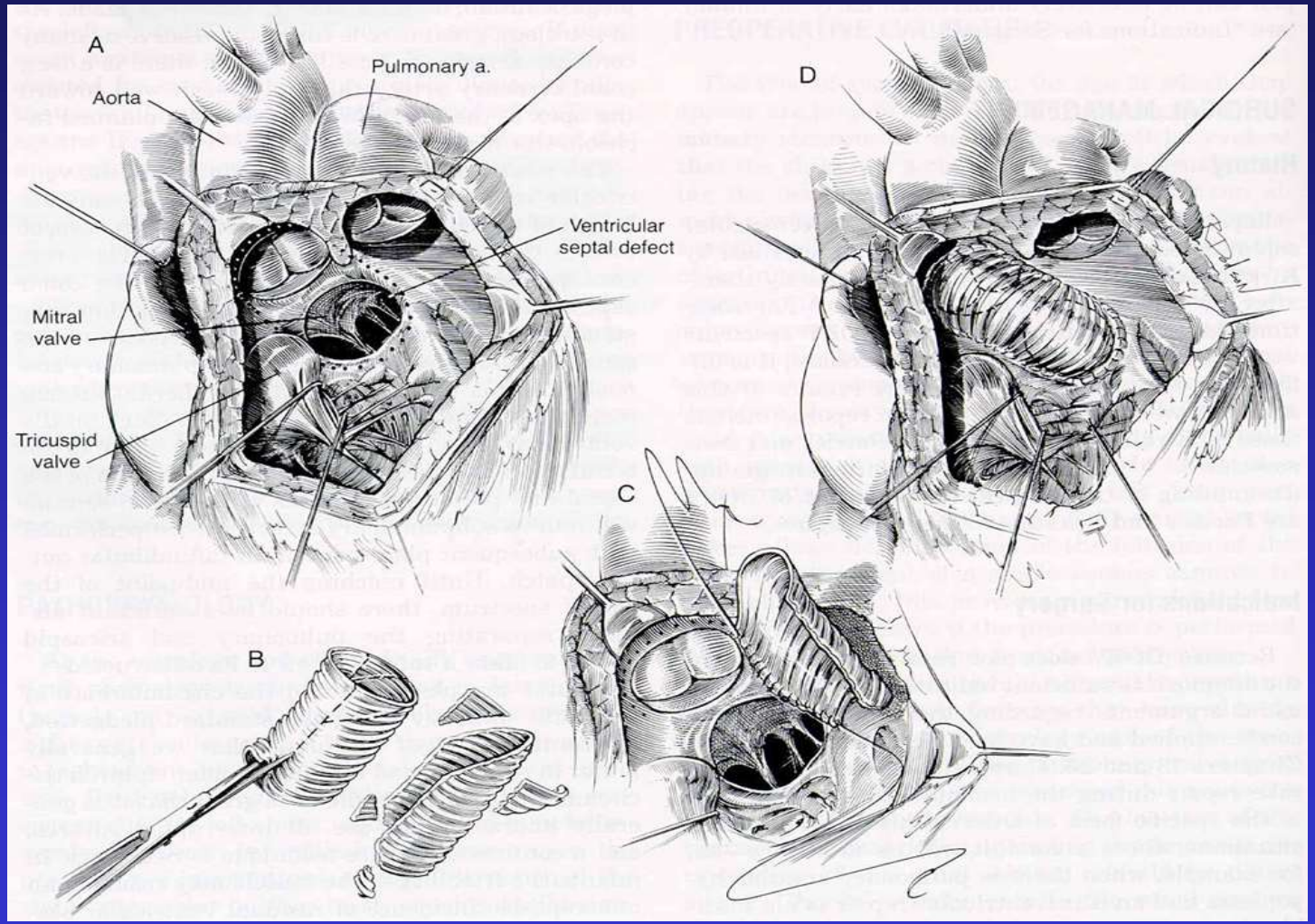
1933-1970

Mayo Clinic



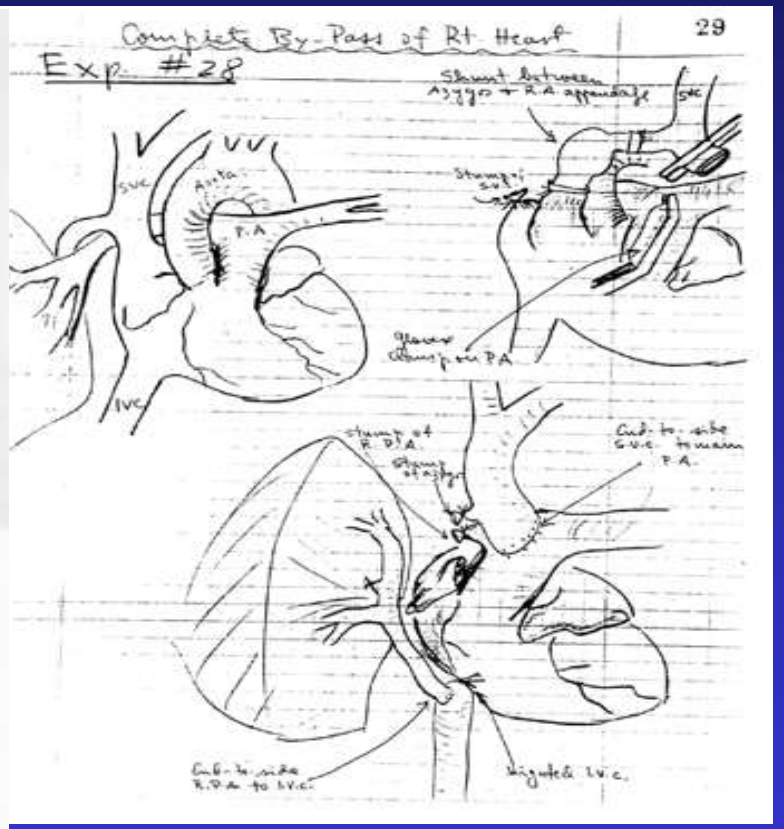
Complex TGA Repair Rastelli Operation 1981

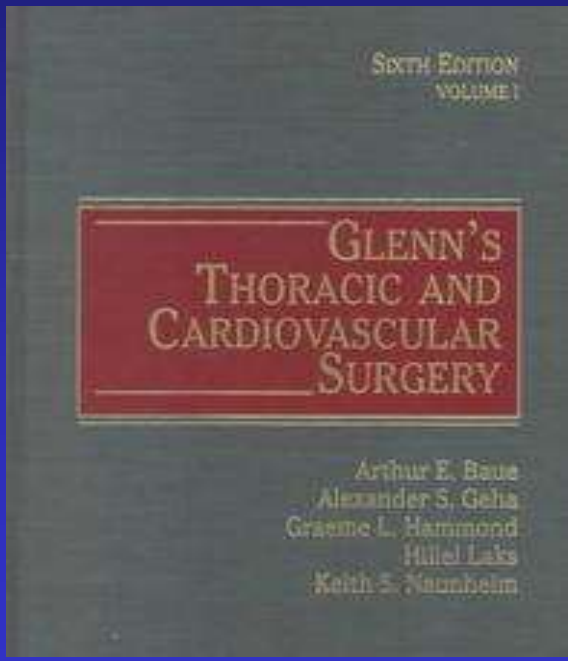
B. Hucin



First unilateral Glenn Anastomosis 1958

William Wallace Lumpkin Glenn





Unilateral Glenn Shunt (1958)

CIRCULATORY BYPASS OF THE RIGHT SIDE OF THE HEART*

IV. Shunt between Superior Vena Cava and Distal Right Pulmonary Artery — Report of Clinical Application

WILLIAM W. L. GLENN, M.D.†

NEW HAVEN, CONNECTICUT

IN the first publication of this series of papers attention was called to the need of a method for the direct delivery of venous blood into the pulmonary arterial circulation.[1] The congenital anomalies of the heart that might be remedied from this operation are characterized by malfunction of the right atrium or right ventricle or both. More specifically, the cardiac conditions that would benefit from circulatory bypass of the right side of the heart include stenosis or atresia of the tricuspid and pulmonary outflow tracts, Ebstein's anomaly, single ventricle, bilocular heart and transposition of the great vessels with an associated pulmonary valvular stenosis. Also, in certain cases of pulmonary hypertension in which the changes in the pulmonary arterioles have not become irreversible, the direct delivery of systemic venous blood into the pulmonary arterial circulation may be beneficial at some time after temporary ligation of the right pulmonary artery. Finally, bypass of the right side of the heart may be indicated when there is obstruction of the cavae where they join the heart, or when there is an abnormal insertion of either cava into the left atrium. Other literature pertinent to this problem has been reviewed previously.[2-3]

*From the Department of Surgery, Yale University School of Medicine.

Supported in part by grants from the Victoria Foundation for Cardiovascular Research at Yale and United States Public Health Service (H851-C-7).

†Associate professor of surgery, Yale University School of Medicine.

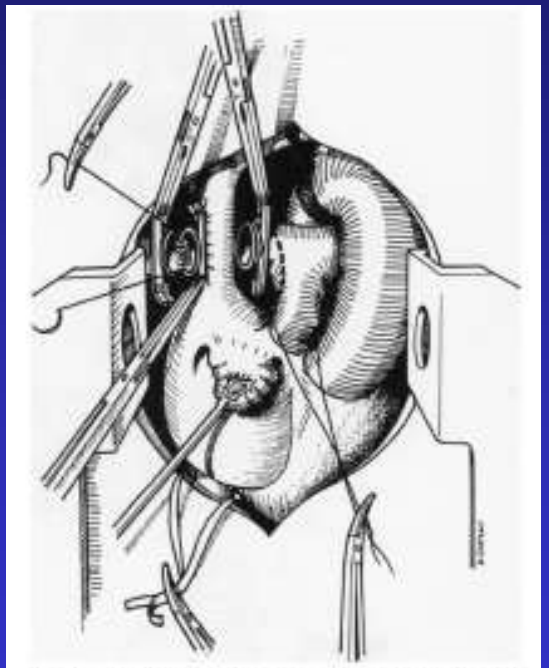


FIG. 2. *First step of the repair: end-to-side anastomosis of distal end of right pulmonary artery to superior vena cava (Glenn, 1958). Drawing illustrates bevelling of proximal end of right pulmonary artery to ensure a correct fit with the aortic valve homograft (see Fig. 3).*

Unilateral Glenn 1962

M.Brodsky

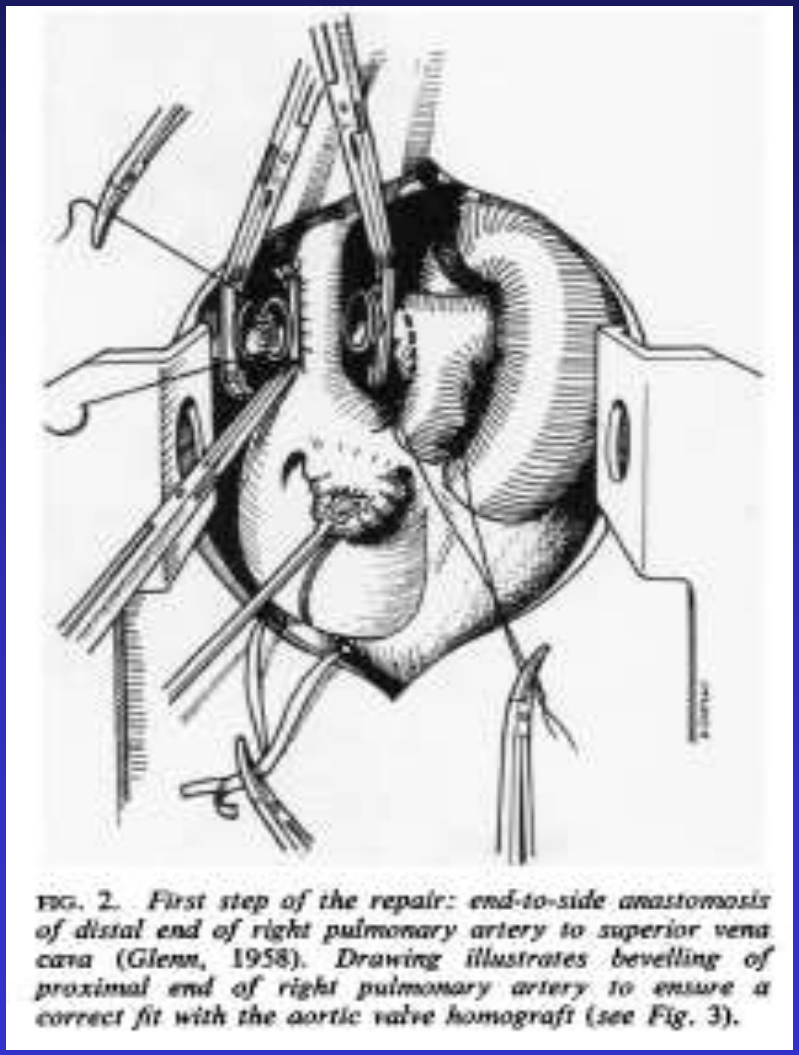


FIG. 2. *First step of the repair: end-to-side anastomosis of distal end of right pulmonary artery to superior vena cava (Glenn, 1958). Drawing illustrates bevelling of proximal end of right pulmonary artery to ensure a correct fit with the aortic valve homograft (see Fig. 3).*

Fontan Operation 1971

'This procedure is not an anatomical correction, which would require the creation of a right ventricle, but a procedure of physiological pulmonary blood flow restoration, with suppression of right and left blood mixing'

(F. Fontan and E. Baudet, Thorax, 1971)

Totale Atrio-Pulmonale Anastomose

Thorax (1971), **26,** 240.

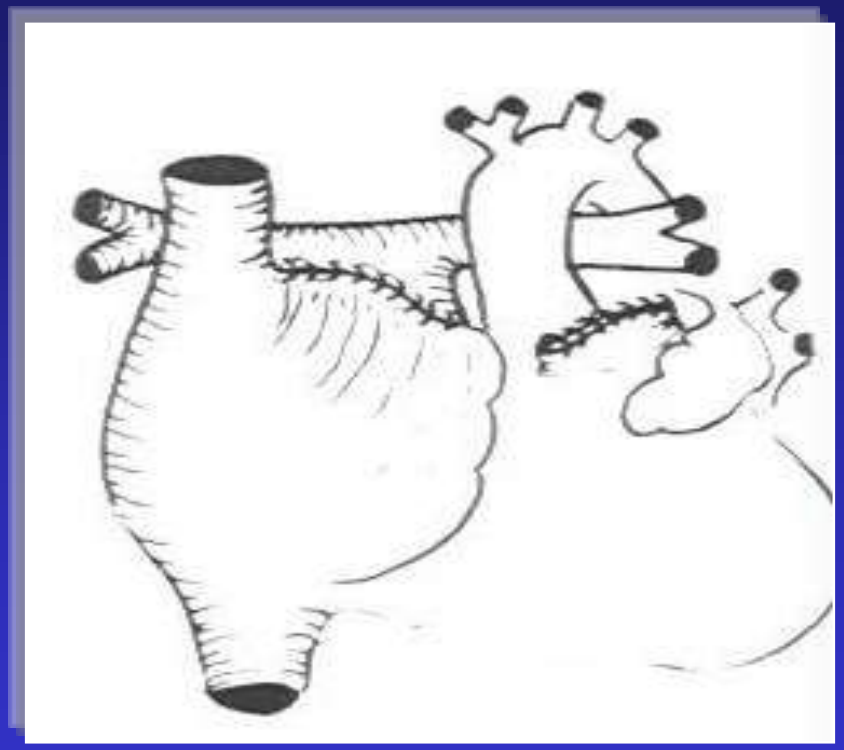
Surgical repair of tricuspid atresia

F. FONTAN and E. BAUDET

Centre de Cardiologie, Université de Bordeaux II, Hôpital du Tondu, Bordeaux, France

Surgical repair of tricuspid atresia has been carried out in three patients ; two of these operations have been successful. A new surgical procedure has been used which transmits the whole vena caval blood to the lungs, while only oxygenated blood returns to the left heart. The right atrium is, in this way, 'ventriclized', to direct the inferior vena caval blood to the left lung, the right pulmonary artery receiving the superior vena caval blood through a cava-pulmonary anastomosis. This technique depends on the size of the pulmonary arteries, which must be large enough and at sufficiently low pressure to allow a cava-pulmonary anastomosis. The indications for this procedure apply only to children sufficiently well developed. Younger children or those whose pulmonary arteries are too small should be treated by palliative surgical procedures.

Kreutzer Modification 1973

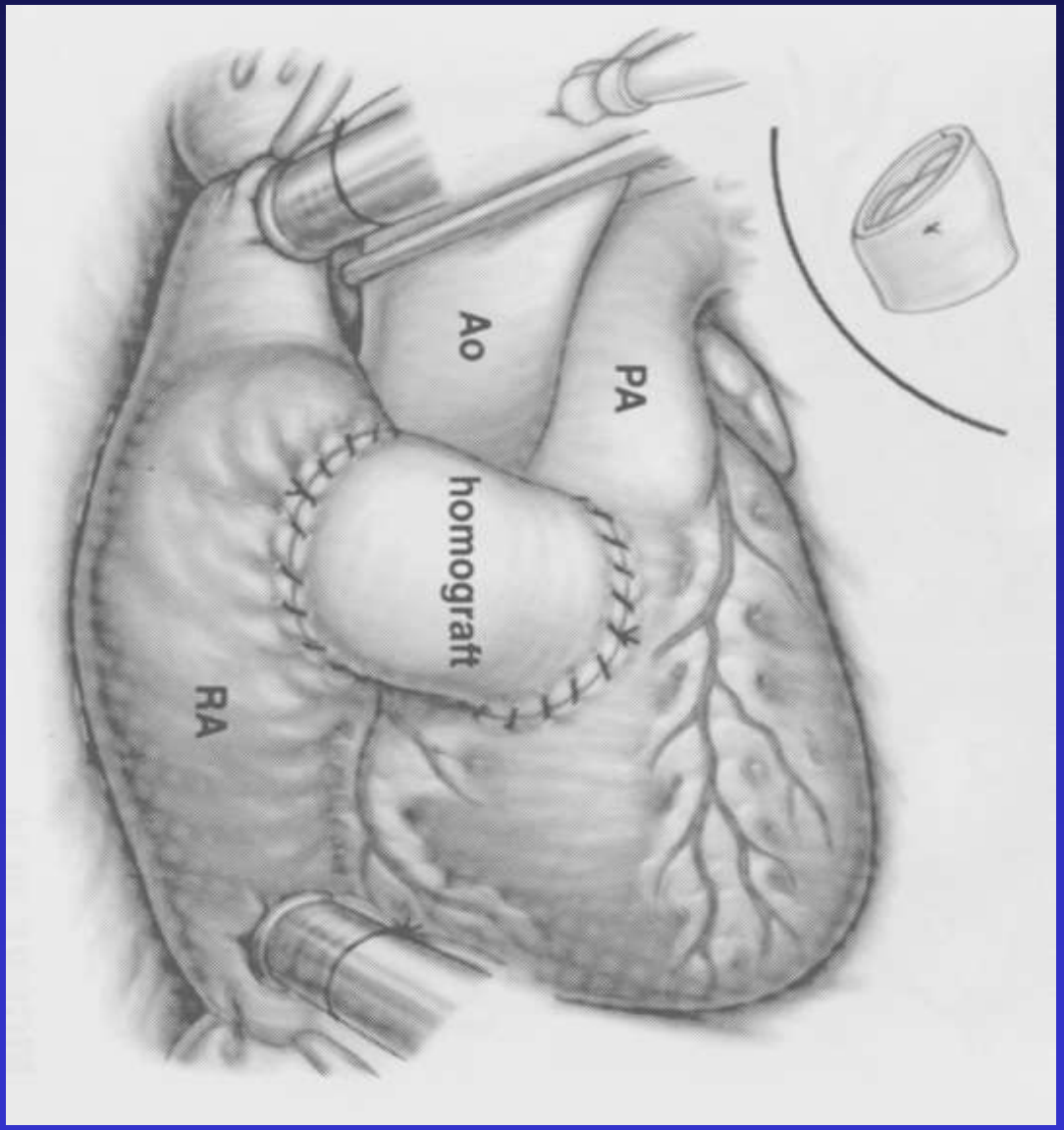


The Kreutzer modification. In this operation the pulmonary valve and main pulmonary artery are detached from the right ventricle and anastomosed to the right atrial appendage. (Kreutzer et al 1973).

Fontan Operation 1984

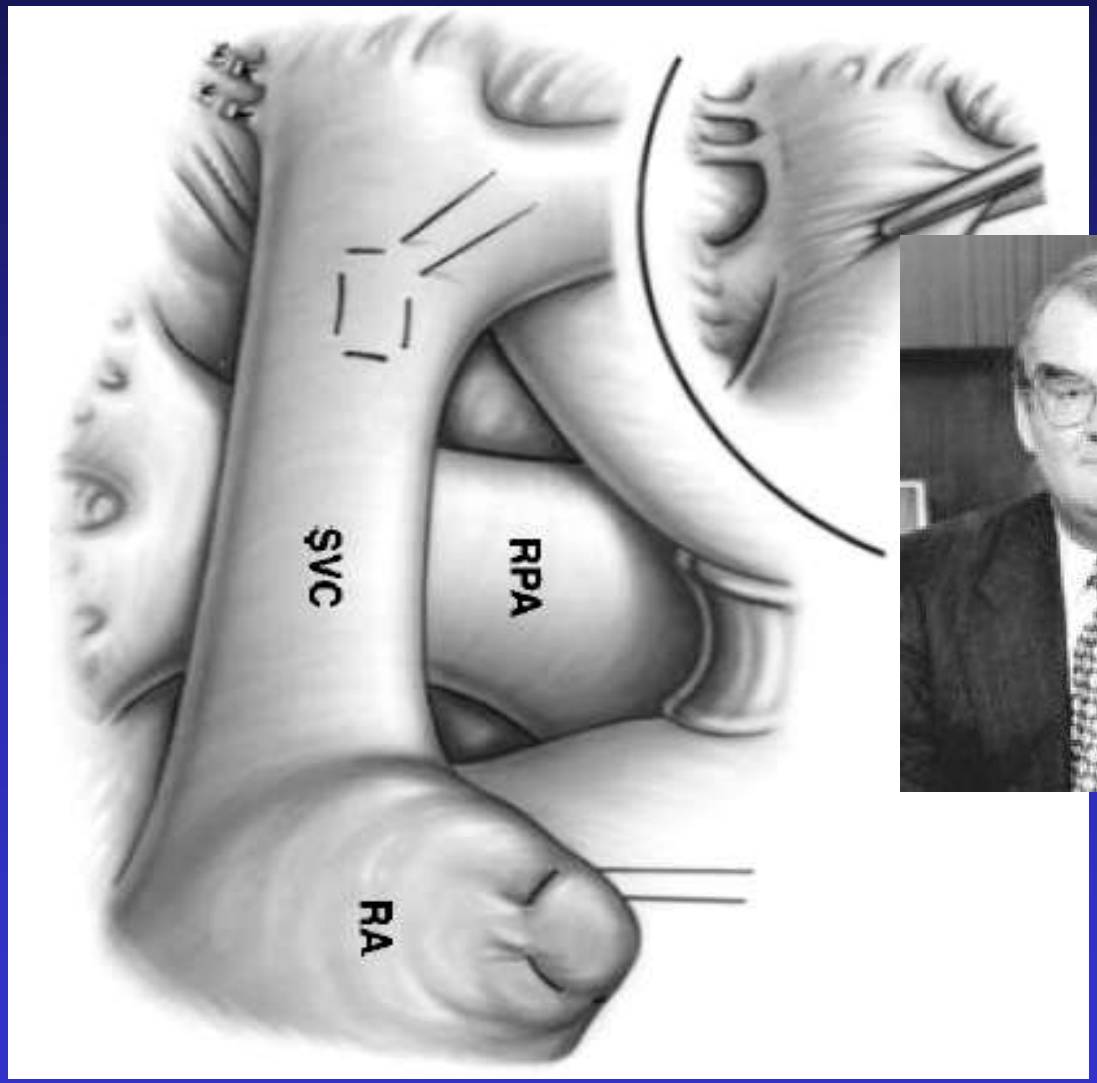
B. Hucin

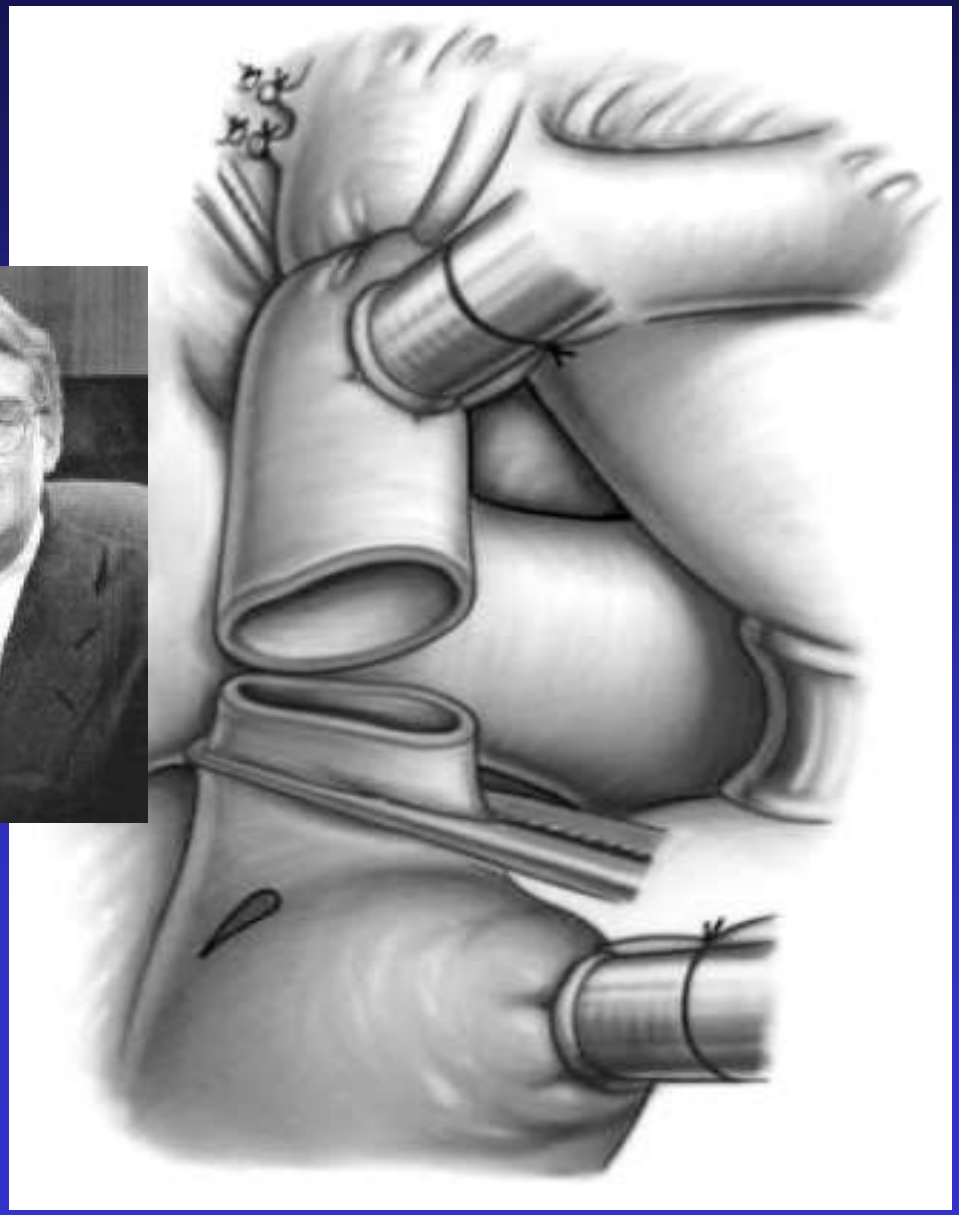
(pat. 17 years)



R. Hopkins Contribution 1985

Bidirektioneller Glenn

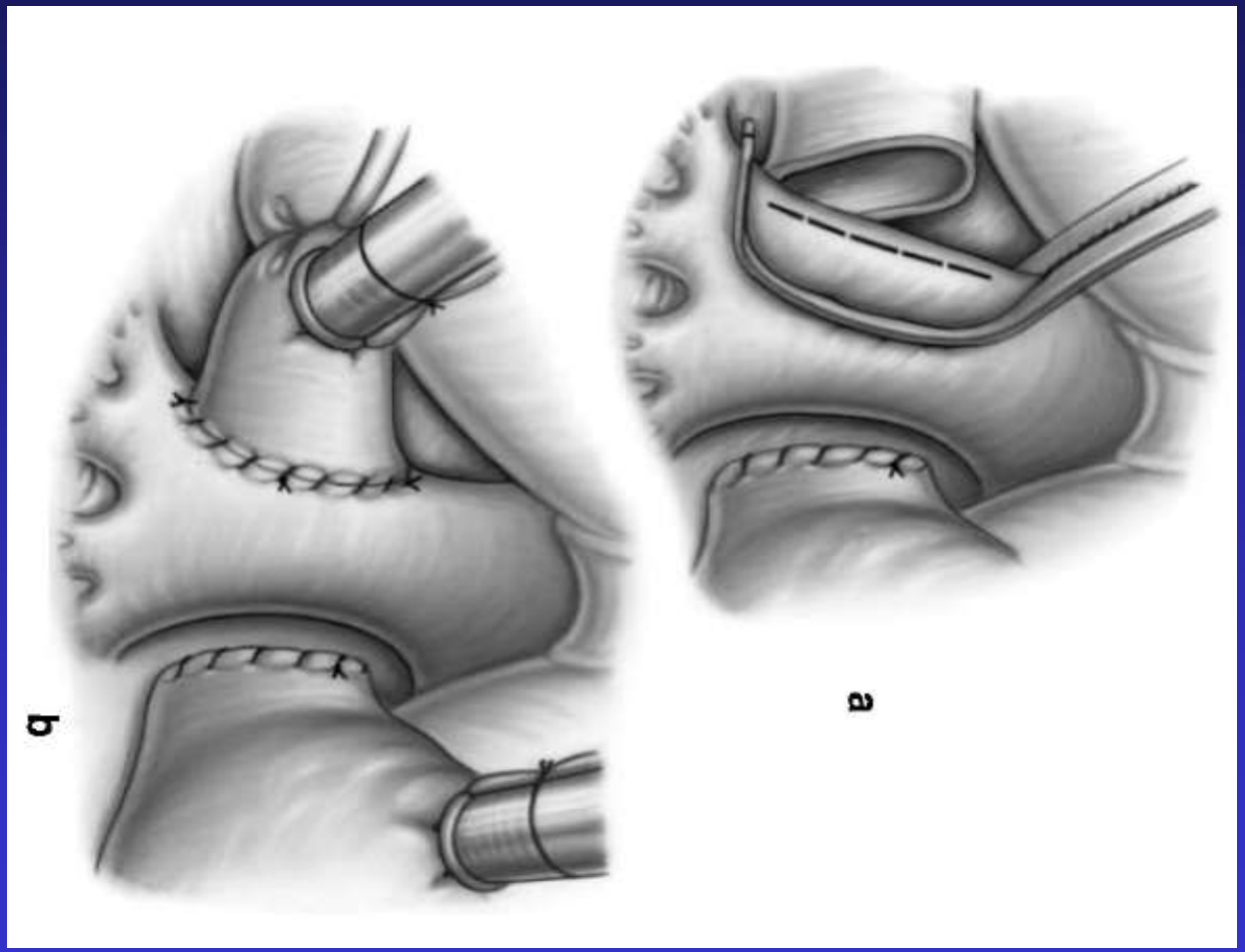




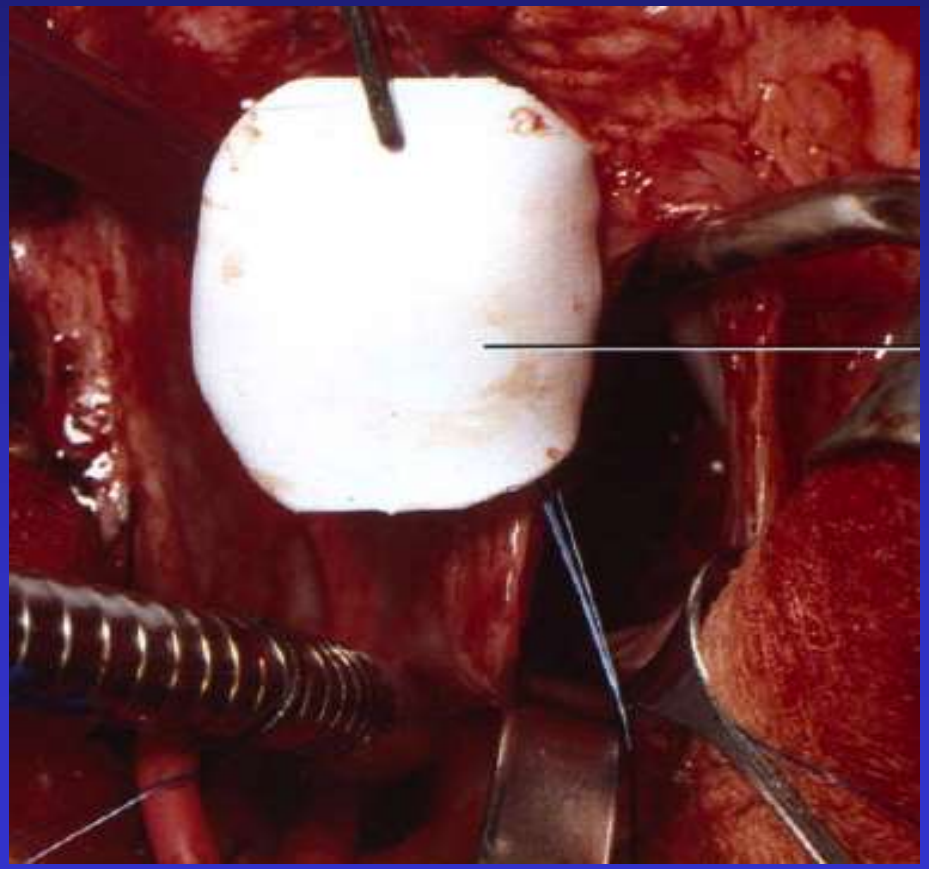
Bidirektioneller Glenn 1990

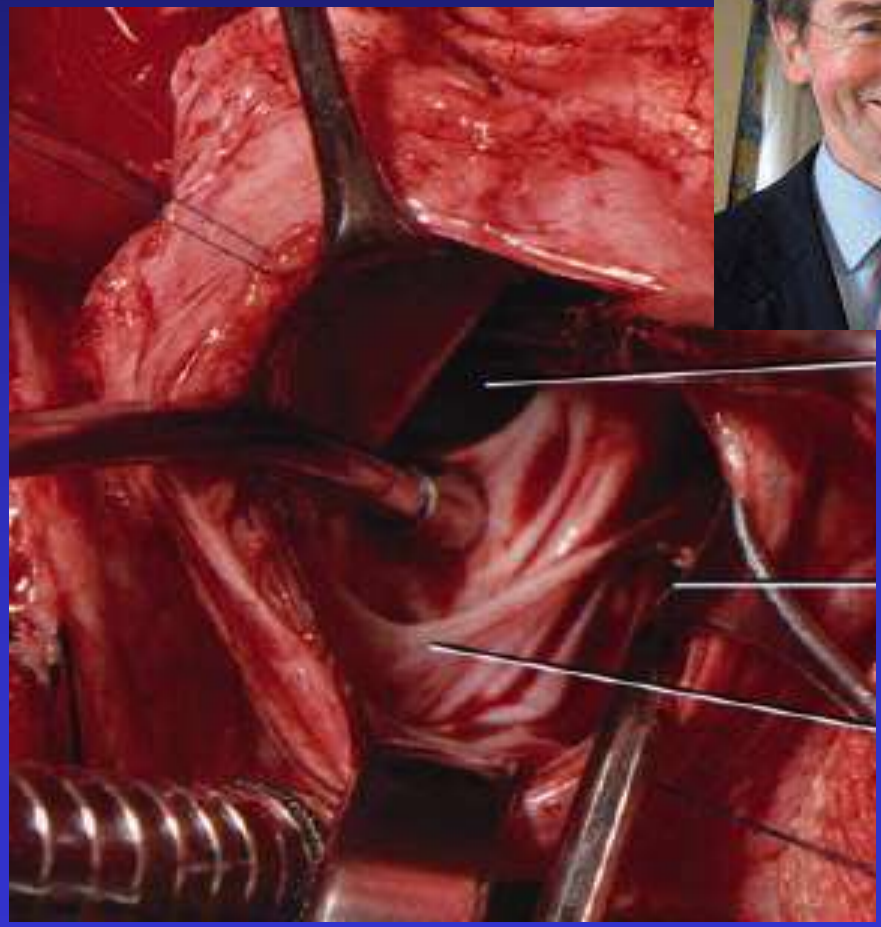
T. Tlaskal

(pat. 3 years)



Intrakardiale TCPC
Lateral Tunnel deLeval 1988

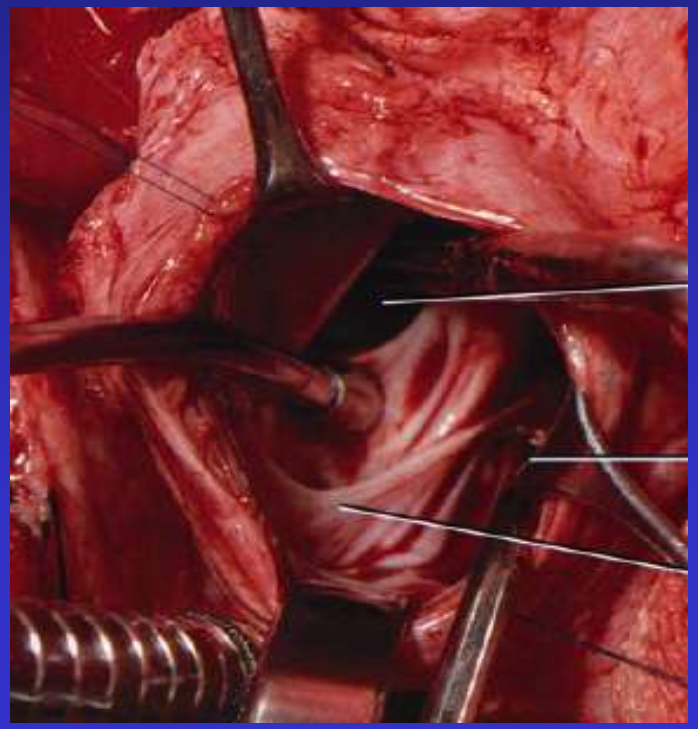


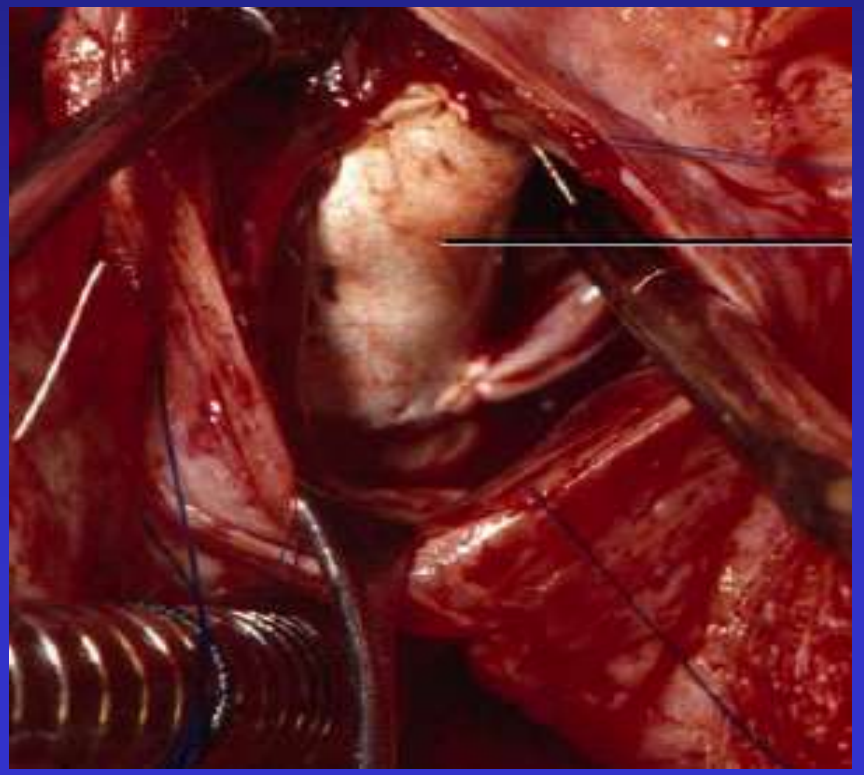


Intracardiac TCPC Lateral Tunnel 1991

P. Horvath

(pat. 5 years)





Extracardiac Fontan (1988)

The Journal of Thoracic and Cardiovascular Surgery, Vol 100, 228-232,

ARTICLES

Inferior vena cava-pulmonary artery extracardiac conduit. A new form of right heart bypass

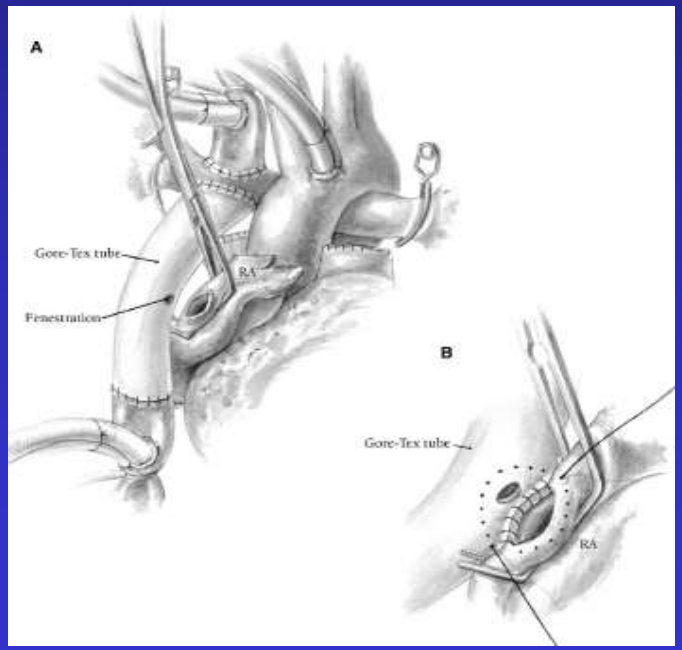
C Marcelletti, A Corno, S Giannico and B Marino
Dipartimento Medico Chirurgico di Cardiologia Pediatrica, Ospedale Bambino Gesu, Rome, Italy.

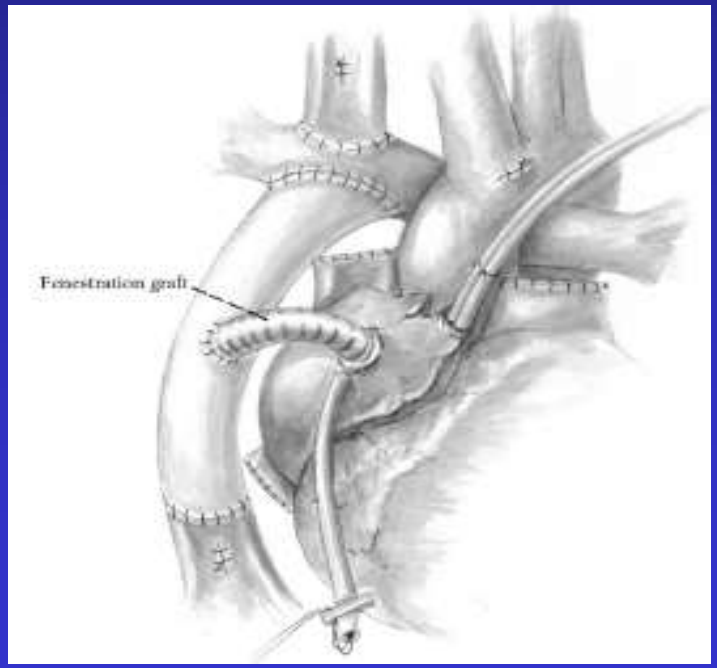
From November 1988 to May 1989, four patients underwent total right heart bypass by means of bidirectional cavopulmonary anastomosis and interposition of an extracardiac conduit from the inferior vena cava to the pulmonary artery. All of them had an uneventful postoperative course, and there have been no early or late deaths. We propose this technique as an alternative surgical option in candidates for a Fontan procedure with (1) hypoplasia or atresia of the left atrioventricular valve, (2) common atrioventricular valve, (3) anomalies of systemic and pulmonary venous return, or (4) auricular juxtaposition.

Extracardiac TCPC complettion 1996

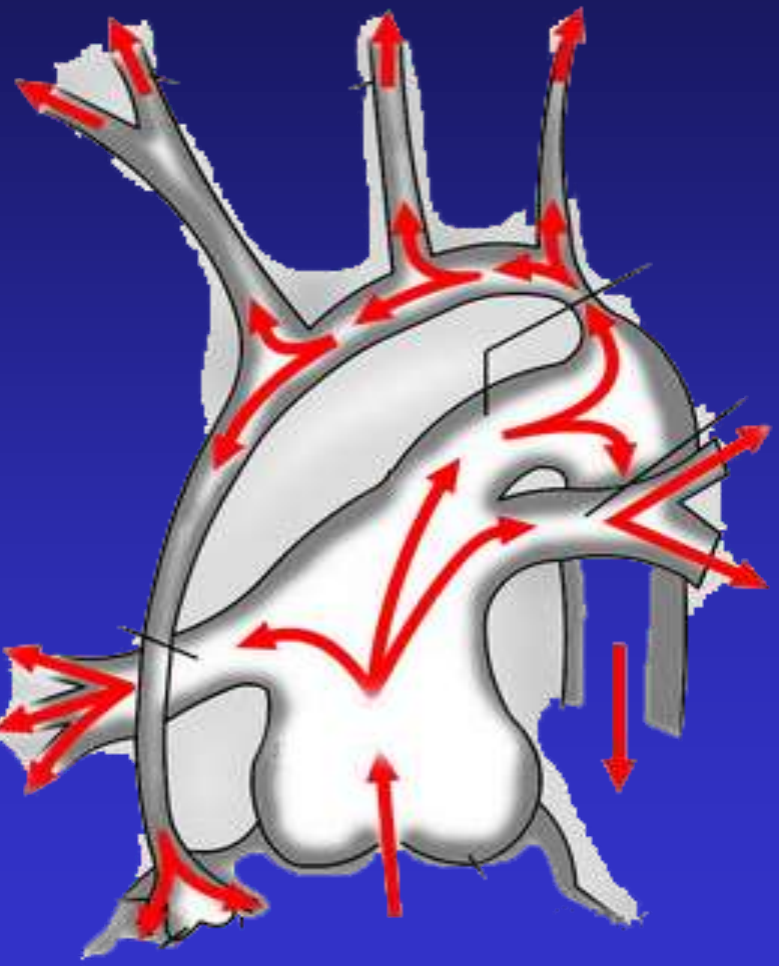
M.Kostelka

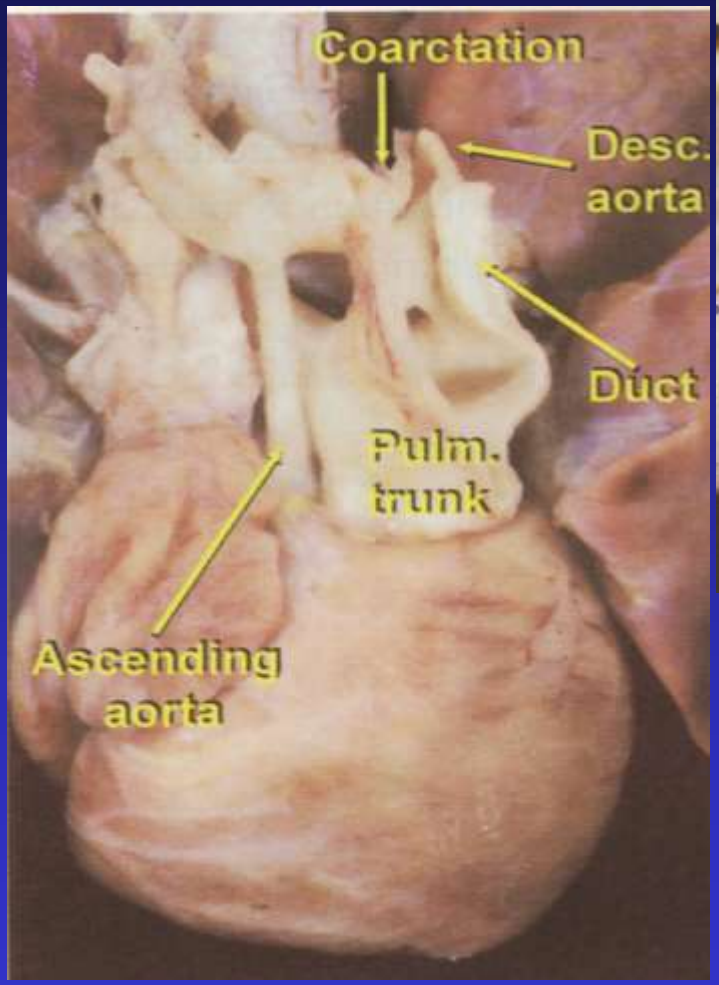
(pat.4 years)

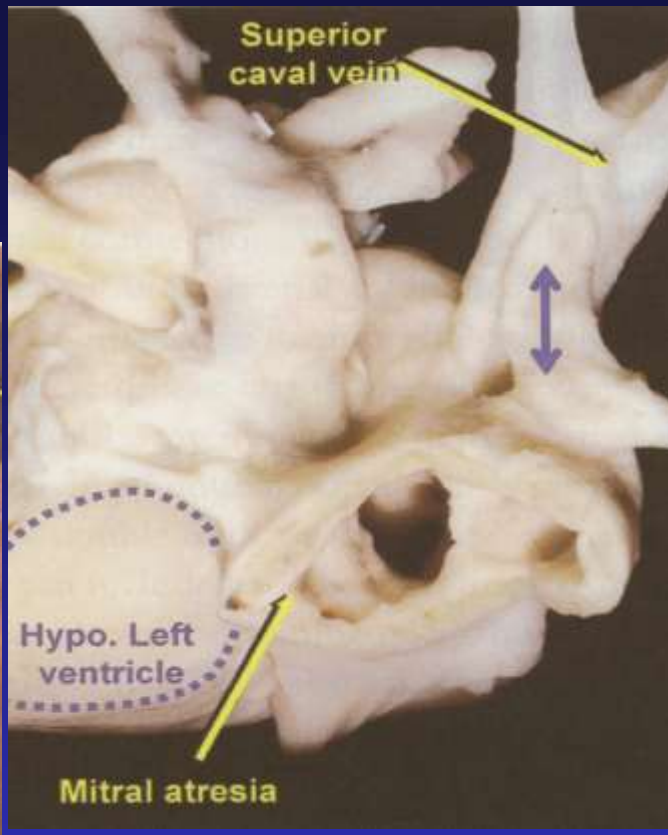




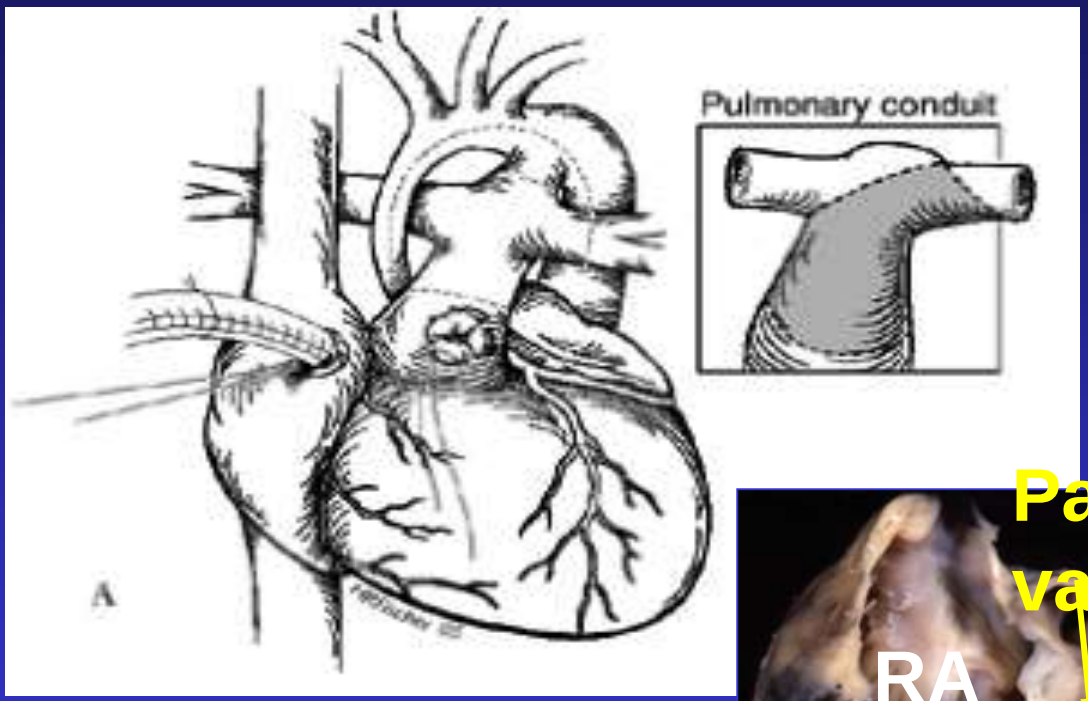
HLHS

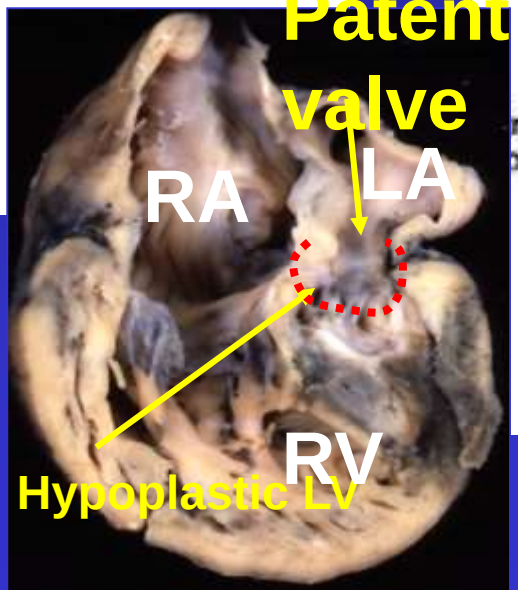


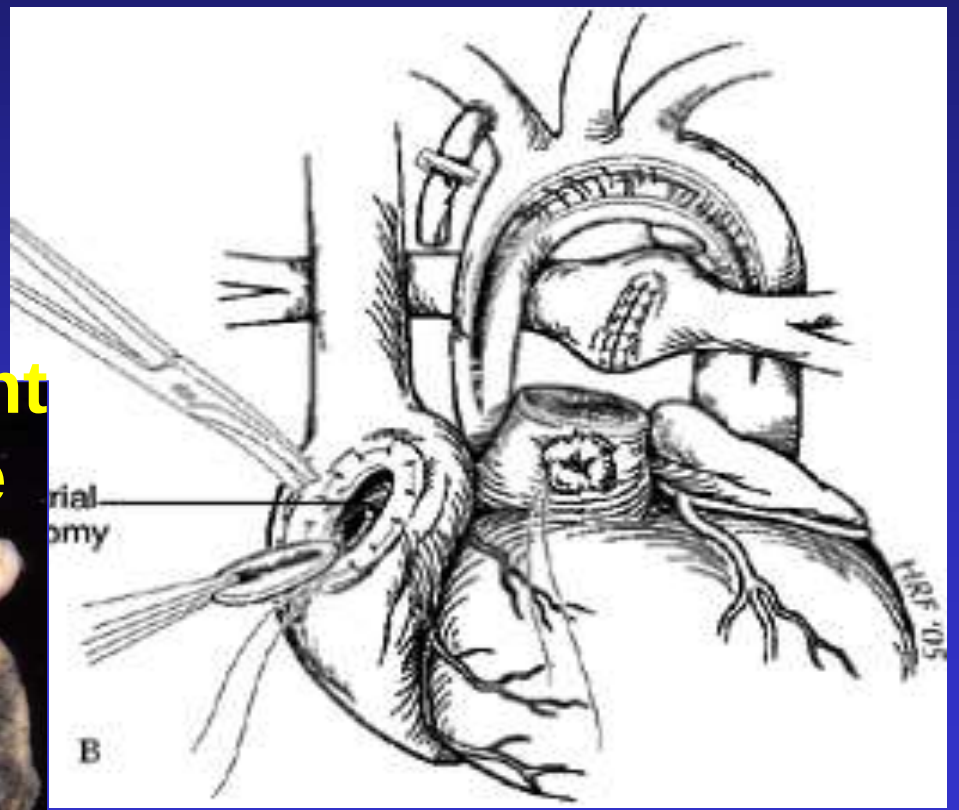

Coarctation
Desc.
aorta
Duct
Pulm.
trunk
Ascending
aorta


Superior
caval vein
Hypo. Left
ventricle
Mitral atresia

Norwood I-Operation 1981

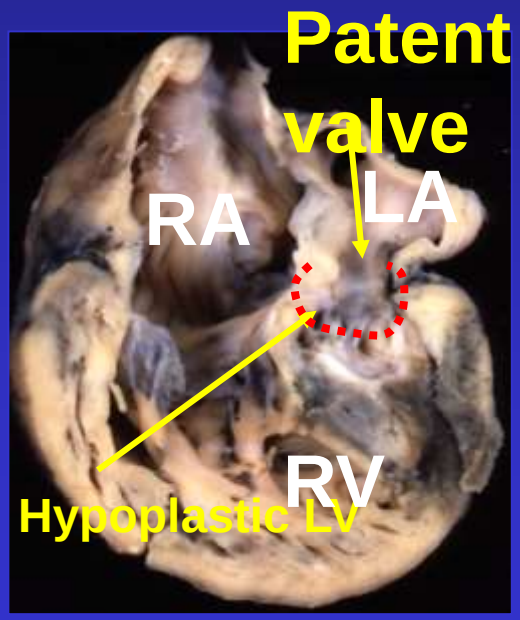


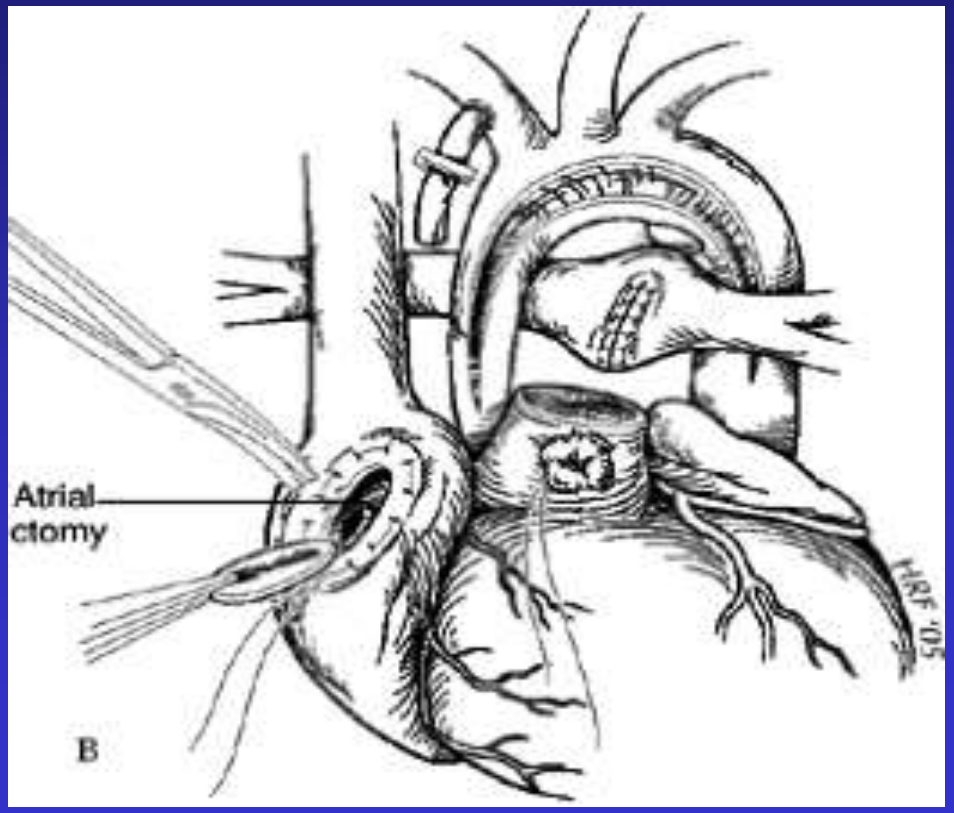




Norwood I-Operation 1996

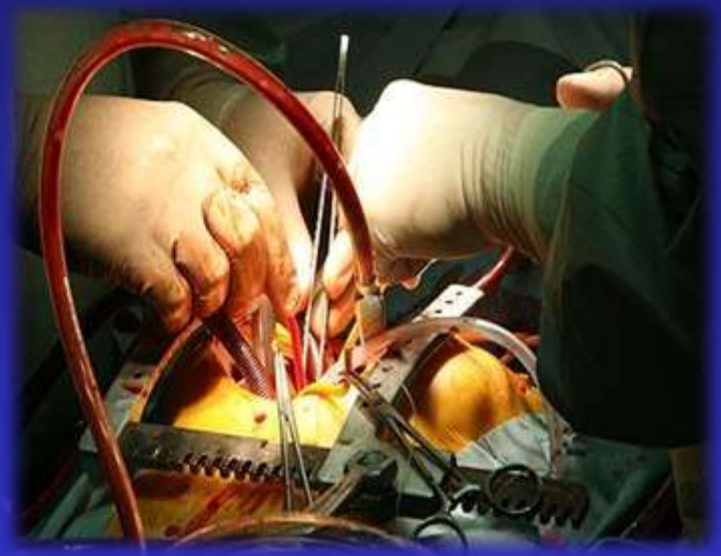
M.Kostelka
(pat. 2 days)





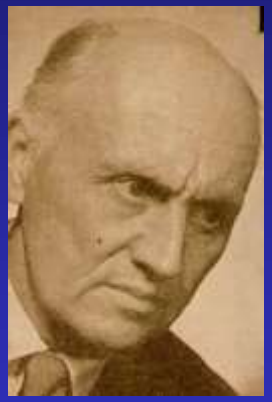
Ceska Kongenitalni Kardiochirurgie

Odvaha
Pracovitost
Cilevedomost
Zodpovednost
Vynalezavost
Zvedavost
Vytrvalost
Skromnost **(u nekterych)**














DETSKA

KARDIOCHIRURGIE

POSLANIM

Medicina z Pohledu Pretizeni v G

Nechirurgicke Obory

Ostatni Chirurgicke a Intervencni Obory

Detska Kardiochirurgie

Bez moznosti katapultace

1987-1998: Motol Krankenhaus - Karl's Universität Prag Kinderherzzentrum

Prof. Milan Samanek

Prof. Bohumil ucin

Prof. Prochazka

Prof. Eliska

1990- 1991 Great Ormond Street Hospital London

Prof. Jaroslav Stark

Prof. Marc de Leval

Prof. Martin Elliot

1994: Children´s Hospital Harvard University Boston

Children's Hospital Boston

Prof. Richard Jonas

Prof. Aldo R. Castaneda

1997: UCSF Medical Center San Francisco

Prof. Frank Hanley

UCSF Medical Center

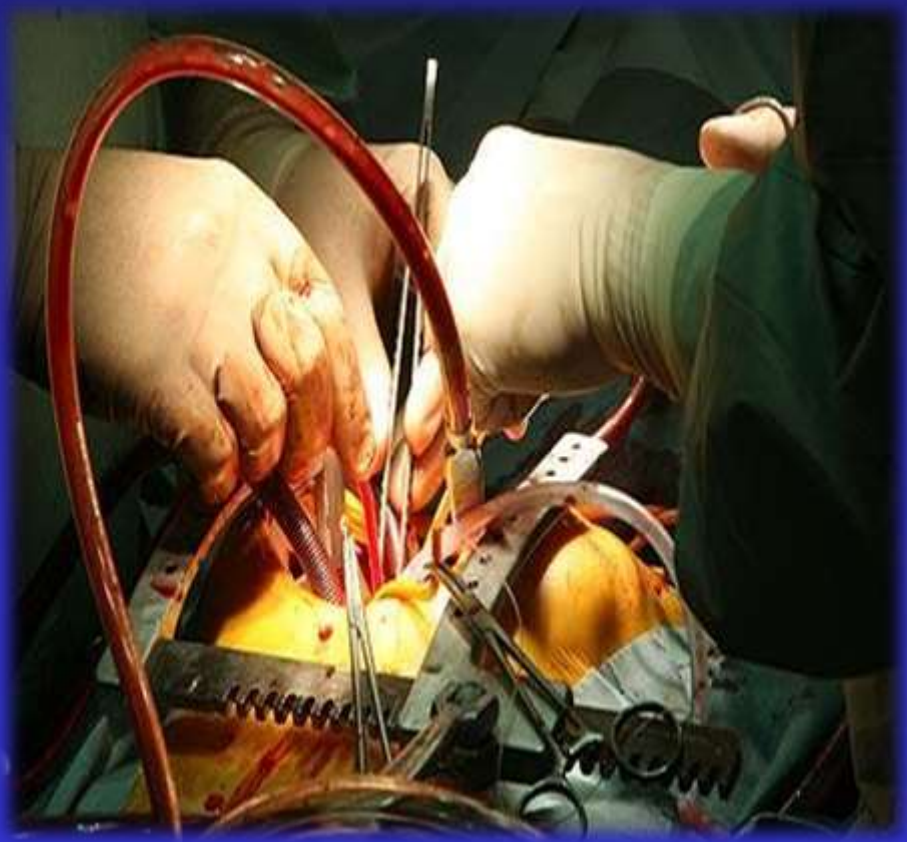
1997: UCLA Los Angeles

ChildrensHospitalLosAngeles
International Leader in Pediatrics

Prof. Hillel Laks

Prof. Vaughn Starnes

Seit 8/1998: Herzzentrum Universität Leipzig




Dekuji Vam za Pozvani a Pozornost

Berlinale 2016 „ 24 Wochen“

Nominace jako jediny nemecky film do hlavni souteze