นิพนธ์ต้นฉบับ

Infective endocarditis and surgery: 10 years experience at Chulalongkorn Hospital.

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Objective: *To review the indications and results of surgical treatment in infective endocarditis.*

Setting: *Division of Thoracic Surgery, Department of Surgery, Faculty of Medicine, Chulalongkorn University.*

Design : *Retrospective study.*

Material + Methods: *Medical records of patients with infective endocarditis treated during 1986 to 1995 was reviewed.*

Results: *During the years 1986-1995 there were 344 patients with infective endocarditis (IE) in our hospital. Thirty seven IE patients (about 10 percent) were operated upon between 1986 - 1995. Thirty one medical records were available for analysis ;where in 27 were native valve IE, 4 prosthetic valve IE. There were 921 valve replacement of all kinds during that period; making the incidence of surgery upon prosthetic valve IE around 0.4 percent. The most common and most important indication for surgery was heart failure. We adopted the point system proposed by Alsip et al in 1985. Severe heart failure,fungal IE, persistent bacteremia, or unstable prosthesis were given 5 points,etc. Our patients had average of 7 - 8.5 points. We should operate on our patients earlier.*

Conclusion : *Ten percent of patients with infection endocarditis were operated upon and the most common indication for surgery was heart failure.*

Key word : *Infective endocarditis.*

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วัตถุประสงค์ : *เพื่อศึกษาถึงข้อชี้บ่งในการผ่าตัดและผลของการผ่าตัดรักษาภาวะ infective endocarditis*

สถานที่การศึกษา : *หน่วยศัลยศาสตร์ทรวงอก ภาควิชาศัลยศาสตร์ คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย*

รูปแบบการวิจัย : *การศึกษาผลย้อนหลัง*

วัสดุและวิธีการ : *รวบรวมจากเวชระเบียนผู้ป่วยโรค infective endocarditis ที่ได้รับการรักษาที่ ร.พ.จุฬาลงกรณ์ ระหว่างปี พ.ศ.2529 ถึง 2538*

ผลการศึกษา : *ระหว่างปี พ.ศ.2529-2538 มีผู้ป่วย Infective Endocarditis (IE) ร.พ.จุฬาลงกรณ์ 344 ราย 37 รายได้รับการผ่าตัด คิดเป็นประมาณร้อยละ 10 ในจำนวนนี้ค้นเวชระเบียน เพื่อการวิเคราะห์ได้ 31 ราย 27 รายเป็น IE ของลิ้นหัวใจธรรมชาติ 4 ราย เป็น IE ของลิ้นหัวใจเทียม ในช่วงเวลาดังกล่าวมีการผ่าตัดเปลี่ยนลิ้นหัวใจเทียมทุกชนิด 921 ราย ทำให้มีอุบัติการณ์ผ่าตัดลิ้นหัวใจเทียมที่เป็น IE ประมาณร้อยละ 0.4 ข้อบ่งชี้ที่บ่อยและสำคัญที่สุดในการผ่าตัด IE คือภาวะหัวใจล้มเหลว เราได้ยึดตามแนวทาง Point System ซึ่งเสนอแนะโดย Alsip และคณะเมื่อ พ.ศ.2528 โดยที่ได้แก่ ภาวะหัวใจล้มเหลวรุนแรง IE จากเชื้อรา การคงอยู่ของจุลชีพในเลือด หรือลิ้นหัวใจเทียมไม่มั่นคง,จะได้คะแนน 5 แต้ม ฯลฯ และพิจารณาใช้วิธีรักษาโดยการผ่าตัดเมื่อผู้ป่วยได้รับคะแนน 5 แต้มขึ้นไป ผู้ป่วยจากรายงานนี้ได้รับแต้มเฉลี่ย 7-8 แสดงว่าผู้ป่วยน่าจะได้รับการผ่าตัดที่รวดเร็วขึ้น*

สรุป : *ประมาณ 10 % ของผู้ป่วยโรค infection endocarditis ได้รับการรักษาโดยการผ่าตัด และข้อชี้บ่งในการผ่าตัดที่พบมากที่สุด ได้แก่ ภาวะหัวใจล้มเหลว*

Infective endocarditis is not an uncommon disease but is seen worldwide. It is usually treated medically. Surgery is considered only after a course of medical treatment with persistent or relapses of fever, bacteremia, heart failure, major or recurrent minor embolism or large vegetation. The purpose of this study is to review our experience for surgery in infective endocarditis at our hospital for the past 10 years.

Materials and Methods

Hospital file records of patients with infective endocacarditis (IE) between 1986-1995 were identified. Those operated upon between 1986 -1995 were analysed.

Results

During 1986-1995 there were 344 patients coded as having infective endocarditis at our hospital. Thirty seven IE patients were operated upon between 1986-1995, making an operative incidence of around 10 percent. Thirty one of these medical records were available for analysis, Twenty seven were native valve IE, while four were prosthetic valve IE. There were 921 valve replacements of all kinds done during that period, making the incidence of surgery for prosthetic valve IE around 0.4 percent. Among 27 native valve IE cases, 17 were male,10 were female,and the age range was 5-59 (mean 33). Valve positions were 17 aortic, 12 mitral, and 7 tricuspid (Table 1). Blood cultures were no growth in 9, staph aureus in 3, Strept. gr.D in 3, not gr.D in 2, Pseudomonas aerugenosa 1 (Table 2). The most common and most important indication for surgery was heart failure in 20, persistent fever in 3, and one each for embolism, large vegetation, severe aortic regurgitation (AR) and mitral valve (MV) perforation. (Table 3.) The mean point rating was 7 (range 3-13) according to Alsip, et al. Predisposing factors for IE were unknown in 17, intravenous drug users (IVDU) in 5 and one each for positive anti-human immuno-deficiency virus (Anti HIV+), nephrotic syndrome, rheumatic heart disease (RHD), cerebrovascular accident (CVA) and surgical closure of an atrial septal defect (ASD) (Table 4). Associated complications were peripheral embolism in 2, central nervous system (CNS) embolism in 1, and ruptured aneurysm of the sinus of valsalva in 2.(Table 5) Operations were valve replacement in 27 (with additional valve repair in 3), repair of the sinus of Valsalva in 2. and one each for closure of a ventricular septal defect (VSD), patent ductus arteriosus (PDA) closure and coronary artery bypass graft (CABG) (Table 6). Non fatal post-operative complications were a correction of a valve regurgitation in 1, and post cardiotomy syndrome in 1. There were 5 deaths, one each from prosthetic valve IE, sepsis, ruptured cerebral mycotic aneurysm, cardiac arrest, and one unknown cause (Table 7).

Table 1. Demographic data of infective endocarditis in Chulalongkorn Hospital between 1986-1995.

	Number of patients
Number of IE	344
Number of surgery for IE	37
Number of valve replacements (all kinds)	921
Number of prosthetic valve IE operated upon	4
Native valve IE (27)	
Male	17
Female	10
Age 5-59 years (mean 33)	
Aortic	17
Mitral	12
Tricuspid	7

Table 2. Causative organism isolated by blood cultures from patient with infective endocarditis."

Organism	Number of patients
No growth	9
Staph aureus	3
Strept. Gr. D.	3
not Gr. D	2
Pseudomonas aerugenosa	1

Table 3. Indication for surgery.

Indications	Number of patients
Heart failure	20
Persistent fever	3
Embolism	1
Large vegetation	1
Severe AR	1
MV perforation	1

Table 4. Predisposing factors of patient with infective endocarditis.

Predisposing factors	Number of patients
Unknown	17
IVDU	5
Anti HIV +	1
Nephrotic syndrome	1
RHD	1
CVA	1
Closure of ASD	1

Table 5. Associate complications in patients with infective endocarditis.

Complication	Number of patients
Peripheral embolism	2
Ruptured aneurysm of Sinus of Valsalva	2
CNS embolism	1

Table 6. Surgical procedure for treatment of infective endocarditis.

Operations	Number of patients
Valve replacement	27
Valve replacement with valve repair	3
Valve replacement with repair of sinus of valsalva	2
Valve replacement with closure of VSD	1
Valve replacement with closure of PDA	1
Valve replacement with CABG	1

Table 7. Causes of death after surgical treatment of infective endocarditis.

Causes	Number of patients
Prosthetic valve IE	1
Sepsis	1
Ruptured cerebral mycotic aneurysm	1
Cardiac arrest	1
Unknown cause	1

Among 4 operated upon for prosthetic valve IE, three were female and one was male. The age range was 24-36 (mean 29). Two of these patients were aortic and 2 mitral. The average point rating was 8.5 (range 7-12). One had staph epidermidis and one was complicated by prosthetic valve IE. Two deaths occurred among these 4.

Discussion

The hemodynamic status of the patients with IE should be the determining factor in the timing for cardiac valve replacement,rather than the activity of the infection or the length of pre-operative antibiotic therapy.[1,2] Alsip, et al[2] proposed a point system for determining the need for cardiac surgery during active IE: severe heart failure, moderate heart failure in prosthetic valve IE, fungus etiology, persistent bacterimia, and unstable prosthesis were each given 5 points. Two or more systemic emboli, ruptured sinus of valsalva, or ventricular septum were given 4 points, etc. Accumulation of 5 or more points suggests the need

for valve replacement. Our cases had an average point of 7 (range 3-13) for native valve IE and an average point of 8.5 (range 7-12) for prosthetic valve IE; these findings indicate rather severe disease or late decision making. Decision to operate was rather late may be due to being afraid of the risk of prosthetic valve IE. At surgery, radical procedures may be necessary for myocardial or aortic abscess by implanting a new aortic prosthesis in the ascending aorta, or a saphenous vein bypass between the coronary artery and the aorta above the prosthesis,[1,3] or a Konno procedure for infected mitral, aortic and mycotic ventricular septal defects[3]

References

1. Wilson WR, Danielson GK., Giuliani ER., Washington JA,2d, Jaumin PM, Geraci JE. Valve replacement in patients with active infective endocarditis. Circulation 1978 Oct;58(4):585-8

2. Alsip SG, Blackstone EH, Kirkakub IW, Cobbs CG. Indications for cardiac surgery in patients with active infective endocarditis A J Med 1985 Jun 28;78(68):138-48

3. Calderwood SB, Swinski LA, Karchmer AW, Waternaux CM, Buckley MJ, Prosthetic valve endocarditis : analysis of factors affecting outcome of therapy.J Thorac Cardiovasc Surg 1986 Oct;92(4):776-83

กิตติชัย เหลืองทวีบุญ. สมเกียรติ แสงวัฒนโรจน์. การทะลุของผนังกั้นหัวใจห้องล่างตามหลังภาวะกล้ามเนื้อหัวใจตายอาการขาดเลือดเฉียบพลัน. จุฬาลงกรณ์เวชสาร 2539 มีนาคม; 40(3): 211-216

การทะลุของผนังกั้นหัวใจด้านล่างภายหลังภาวะหัวใจตายจากการขาดเลือดเฉียบพลันพบได้น้อย มักเกิดหลังจากการตายของกล้ามเนื้อหัวใจ 2-3 วัน ผู้ป่วยมีอาการเหนื่อยทันที และมีภาวะโลหิตไปเลี้ยงร่างกายไม่เพียงพอ อัตราตายจะสูงมาก ถ้าหากไม่ได้รับการรักษาทางอายุรกรรมควบคู่กับการผ่าตัดให้ทันท่วงที เสนอรายงานผู้ป่วยรายที่ถูกส่งมาที่โรงพยาบาลจุฬาฯ เนื่องจากภาวะช็อค หลังการตายของกล้ามเนื้อหัวใจทางด้านหน้าและผนังกั้นห้องหัวใจ ผู้ป่วยมีอาการเลือดคั่งในปอด และไตวายเฉียบพลันแม้ได้ยาโดปามีน ไนโตรกลีเซอรีน ขนาดสูงสุด และอินตราเออร์ติค บอลลูน ปั๊มป์ เอคโคคาร์ดิโอแกรม ตรวจพบมีรูที่ผนังกั้นห้องหัวใจขนาดใหญ่ มีเลือดลัดในอัตรา 4 ต่อ 1 โคโรนารีแจงจิโอแกรม พบการอุดตันเต็มที่ของ แอลเอดี และการตีบ 90% ของเส้นเลือดพีดีเอ ซึ่งเป็นแขนงของหลอดเลือดแดงหัวใจด้านขวา การผ่าตัดฉุกเฉินเพื่อปิดรูรั่วของผนังหัวใจ และต่อหลอดเลือดพีดีเอ ทำให้ผู้ป่วยมีอาการดีขึ้นอย่างมาก ภาวะหัวใจวาย และไตวายดีขึ้นจนหายไป กลับสู่ปกติ 3 เดือน หลังการผ่าตัดผู้ป่วยไม่มีอาการเหนื่อยหรือเจ็บหน้าอกสามารถทำงานได้เป็นปกติ

Case report

The patient was a 42 year old male who was previously healthy. He was obese and hypertensive but a non-smoker. He denied any history of chest pain or heart problems. Four days before admission, while he was working as a truck driver, he experienced severe substernal discomfort. He was taken to a nearby private hospital and the diagnosis was acute anteroseptal myocardial infarction. Hew was admitted to the ICU and intravenous heparin and nitroglycerin were given. The pain subsided but on the fourth day after admission, he became severely dyspneic. His blood pressure dropped to 90/70 mmHg and the heart rate was 120/min. He was transferred to Chulalongkorn Hospital.

Upon admission to the Coronary Care unit he was found to be dyspneic and confused. His neck vein swere engorged. A loud holo systolic murmur was heard over his lower left sternal border. His blood pressure was 97/70 mmHg. There was fine crepitation over his lower lung areas bilaterally. An EKG showed acute anteroseptal MI. His chest X-ray showed cardiomegaly and bilateral pulmonary congestion. An emergency echocardiogram showed a defect in his interventricular septum with a left to right shunt of about 4 to 1. A Swan Ganz catheter was inserted via his right subculavian vein; his wedge pressure was 22 mmHg. There was definite oxygen stepup in his right ventricular level. Intravenous nitroglycerin, furosemide and dopamine were given. He did not respond well so an intraaortic balloon was inserted via his right femoral artery.

His condition improved. The initial laboratory tests revealed BUN/Cr. = 60/4.0 His condition stabilized but on the 4th day after admission he became more dyspneic and diaphoretic. His blood pressure dropped to 80/60 mmHg. An emergency coronary angiography was performed. It showed a total occlusion of LAD with poor runoff and 70% stenosis of PDA from the dominant RCA. An emergency operation was performed. With a median sternotomy incision, a saphenous vein was harvested from right lower leg. The aorta was clamped and cold crystalloid cardioplegia was infused via the aortic root. The infarcted area over the LV apex was opened. There was a VSD over the inferior part of the septum measuring about 5 x 6 cm^2. A synthetic dacron patch was used to closed the defect by interruted pledgetted sutures.

The ventriculotomy was closed with two strips of teflon patches and then a distal anastomosis to PDA was performed. The patient was rewarmed and the aortic clamps were released. The proximal anastomosis was then performed. The heart spontaneously returned beating. There was no bleeding from the ventriculotomy. He was weaned from the heart-lung machine without undue difficulty. His postoperative course was rather uneventful. His hemodynamic status was stable and he had good urine flow. His BUN and Cr. progressively returned to normal values. He was extubated 15 hours postoperatively. Examination revealed normal heart sounds and no murmurs. He was discharged home on the 10th postoperative day. Two years after the operation he is healthy without dyspnea nor angina.

Discussion

For most patients, acute myocardial infarction usually responds well to medical treatment alone. However, in less than 5% of the cases, acute rupture of the interventricular septum occurs.[1] It usually occurs as a complication of a first acute myocardial infarction.[2-4] A well developed collateral coronary circulation is uncommonly found in hearts with a postinfarction VSD.[5] It is also generally associated with complete obstruction (rather than severe stenosis) of a coronary artery, usually the LAD.[6] It is important that stenoses usually coexists in the right coronary artery system. It is most commonly located in the anterior or apical portion of the ventricular septum (60%) in association with a full-thickness anterior myocardial infarction. About 20% to 40% of patients have a VSD in the posterior portion of the ventricular septum in association with an inferior myocardial infarction. Because the posterior type of VSD in near to the crux of the heart. Its repair may injure coronary sinus and right coronary artery. So, the operative mortality is higher than the anterior type of VSD. Because post infarction VSD is usually large and resulting in inractable heart failure and pulmonary congestion. Early operation is usually necessary because of high failure rate with full medical treatment including intraaortic ballon pump. But because of friability of necrotic myocardium, the risk of recurrence of VSD and bleeding of the suture line is high. Delaying the operation for one month, if hemodynamically permissive, will make the operation safer. But this is not the usually case. without early operation, mortality rate is very high. The sudden onset of left heart failure is typically due to high shunt flow and an unadaptive left ventricle. The murmur is usually loud and should be differentiated from acute mitral regurgitation from rupture of papillary muscle. Early death rates are high. Only 75% of patients survive the first 24 hours and only 50% survive the first week.[6] An echocardiogram diagnoses the condition accurately. A Swan Ganz catheter should be inserted to confirm the diagnosis by demonstrating oxygen step-up in the right ventricle and also for hemodynamic monitoring. An intraaortic balloon pump should also be inserted immediately because of the tendency of the cndition of these patients to rapidly deteriorate.[7] Coronary angiography is mandatory because multi-coronary vessel in volvement is common. An immediate operation is required because permanent improvement does not folow use of the support devices only.[8] The VSD is always approached through the left ventricle (infarcted area). If there is significant coronary stenosis, a coronary bypass should be added. The internal mammary artery should be grafted to LAD if possible. In rare patients who have stable hemodynamic, repairs may be delayed for 2-3 weeks to allow the edge of defect to become fibrotic with less tendency to develop recurrent VSD in the postoperative period. In 10-25% of patients recurrent VSD happens usually due to reopening of the closed defect. The hospital mortality rate is usually about 35%.[9] Prompt surgical intrvention after minimal investigation, good myocardial preservation and coronary

grafting, if indicated, are principles to improve the results.

Conclusion

Here we reported a male patient with a ventricular septal defect complicating acute anteroseptal myocardial infarction. Despite miximal inotropic support, including intraaortic balloon counter-pulsation, his hemodynamic condition was severely impaired with pulmonary congestion, oliguria and acute renal failure and cardiogenic shock. Proeoperative coronary angiography revealed total occlusion of LAD and stenosis of PDA from RCA. Emergency patch closure of VSD and CABG to PDA was performed. The patient improved markedly and able to be weaned from a cardiopulmonary bypass with minimal inotropic support. The aortic ballon could be removed shortly after surgery. Follow up of this patient for more than one year this patient is in functional class one. No recurrence of VSD has been detected. We support an aggressive approach to post acute MI VSD with minimal workup and prompt surgery.

References

1. Jonas V, Hynick V, Chulumsky J, Chlumska A. Eight-year survival after perforation of ventricular septum in myocardial infarction. Acta Univ Carol-Med 1970; 16(1): 133-44.
2. Herlitz J, Samuelsson SO, Richter A, Hjalmarson A. Prediction of rupture in acute myocardial infarction. Clin Cardiol 1988 Feb; 11(2): 63-9
3. Matsui K, Kay JH, Mendez M, Zubiate P, Vanstrom N, Yokoyama T. Ventricular septal rupture secondary in myocardial infarction. Clinicl approach and surgical results. JAMA 1981 Apr 17; 245(15): 1537-9
4. Moore CA, Nygaard TW, Kaiser DL, Cooper AA, Gibson RS. Postinfarction ventricular septal rupture; the importance of location of infarction and right ventricular function in determining survival. Circulation 1986 Jul; 74(1): 45-55
5. Skehan JD, Carey C, Norrell MS, de Belder M, Balcon R, Mills PG. Patterns of coronary artery disease in post-infarction ventricular septal rupture. Br heart J 1989 Oct; 62(4) 268-72
6. Oyamda A, Queen FB: Spontaneous rupture of an interventricular septum following acute myocardial infarction with some clinicopathological observations of survival in five cases. Presented at the Pan Pacific Pathology Congress, Tripler U.S. Army Hospital, Honolulu, Hawaii, October 12, 1961.
7. Gold HK, Leinbach RC, Sanders CA, Buckley MJ, Mundth ED, Austen WG. Intra aortic balloon pumping for ventricular septal defect or mitral regurgitation complicating acute myocardial infarction. Circulation 1973 Jun 47(6): 1191-6

8. Buckley MJ, Mundth ED, Daggert WM, Gold HK, Leinbach RC, Austen WG. Surgical management of ventricular septal defects and mitral regurgitation complicating acute myocardial infarction. Ann Thorac Surg 1973 Dec; 16(6): 598-609

9. Daggett WM, Guyton RA, Mundth ED, Buckley MJ, McEnany MT, Gold HK, Leinbach RC, Austen WG. Surgery for post myocardial infarct ventricular septal defect. Ann Surg 1977 Sep; 186(3): 260-71