รายงานผู้ป่วย

Case Report

การซ่อมลิ้นหัวใจไมตรัลในผู้ป่วยที่มีการติดเชื้อของเยื่อบุหัวใจชั้นใน ร่วมกับภาวะอ่อนแรงของร่ายกายซีกขวา

Mitral Valve Repair in Patient with Acute Infective Endocarditis and Right Hemiplegia

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บทคัดย่อ

แม้จะมีความก้าวหน้าอย่างต่อเนื่องในการรักษาภาวะอักเสบติดเชื้อของลิ้นหัวใจไมตรัลด้วยการให้ยาและการผ่าตัด แต่ผู้ป่วยที่มีปัญหาจากโรคนี้ยังคงมีอัตราการเจ็บป่วยและอัตราการตายสูง โดยเฉพาะอย่างยิ่งถ้าเกิดมีภาวะแทรกซ้อนคือการอุดตันของเส้นเลือดร่วมด้วย ปัจจุบันการซ่อมแซมลิ้นหัวใจไมตรัลด้วยการผ่าตัดเป็นการรักษาที่ได้รับการยอมรับสำหรับปัญหาที่เกิดจากการหย่อนย้อยของลิ้นหัวใจไมตรัล รวมถึงกรณีการทำลายของลิ้นหัวใจไมตรัลจากการอักเสบติดเชื้อ แต่ก็ยังมีความกังวลเกี่ยวกับประสิทธิภาพ ความคงทนและช่วงเวลาของการเริ่มให้การรักษา โดยเฉพาะการผ่าตัดซ่อมแซมในระยะเฉียบพลันซึ่งมีความท้าทายทางเทคนิคการผ่าตัดมาก เนื่องจากต้องตัดเนื้อเยื่อที่ติดเชื้อและตายออก รายงานผู้ป่วยนี้เป็นผู้ป่วยหญิงอายุ 63 ปี มีการอักเสบติดเชื้อของลิ้นหัวใจไมตรัลและมีภาวะอ่อนแรงของร่างกายซีกขวาจากการอุดตันของเส้นเลือดในสมอง แต่ฟื้นตัวกลับมาปกติก่อนผ่าตัด ได้รับการผ่าตัดซ่อมแซมลิ้นหัวใจไมตรัลหลังเกิดภาวะแทรกซ้อนทางระบบประสาท 9 วัน หลังการผ่าตัดพบว่าการทำงานของลิ้นหัวใจไมตรัลกลับมาเป็นปกติ และไม่พบภาวะแทรกซ้อนทางระบบประสาทอีก

คำสำคัญ: การติดเชื้อของเยื่อบุหัวใจชั้นใน ลิ้นหัวใจไมตรัล ความผิดปกติทางระบบประสาท
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Abstract

Despite ongoing advances in medical and surgical therapy of mitral valve infective endocarditis (IE) disease, patients with these acute problems still remain have high morbidity and mortality especially concomitant with the embolic complication. Mitral valve repair is now considered the preferred treatment of mitral regurgitation caused by leaflet prolapsed and also in perforated and destroyed leaflet of IE disease. In the setting of IE, some concerns have been raised about the efficacy, durability and the timing of the complex repair particularly in the acute phase. Surgical intervention for IE is technically challenging because of the extensive tissue destruction that require reconstruction after radical debridement of infected and necrotic tissue. In this study case, a 63-year-old woman, who had a recent recovery from right hemiplegia caused by septic emboli from active mitral valve infective endocarditis was successfully underwent mitral valve repair 9 days after onset of neurologic event. After surgery, she had normal mitral valve function and no further aggravation of the brain complication.

Keywords: infective endocarditis, mitral valve, neurologic event
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Introduction

Infective endocarditis (IE) is an inflammation of the endocardium especially heart valves or structure surrounding the heart valves. If untreated, it can lead to life threatening complication and is associated with morbidity and mortality as high as 15-30%.[1] The estimated incidence of infective endocarditis in the general population has ranged from 16 to 62 cases per million person-years.[2-4] Despite evolving practices in the diagnosis and treatment strategies of infective endocarditis, the morbidity and mortality does not significantly decrease.[5]Treatment for infective endocarditis consists of antibiotic therapy or surgery, or both. David and colleagues[6] reviewed 266 patients with active-phase IE who underwent mitral valve (MV) operations and found that those with impaired left ventricular function (EF<40%) exhibited high operative mortality of 14% compared to overall mortality of 9%. However, controversies exist regarding the timing and aggressiveness of surgical intervention.[7,8] This reported case, I described my experience of early mitral valve repair in the patient with acute destructive mitral valve IE complicated by cerebral emboli.

Case report

A 63-year-old female patient was referred to Buddhachinaraj Phitsanulok hospital because of fever and shortness of breath with sudden breathlessness at rest and severe fatigue (New York Heart Association class III/IV cardiac failure). She had complained of severe myalgia and loss of appetite for 10 days prior to her admission. 2 specimens of blood culture were positive for *Staphylococcus aureus*. Transthoracic echocardiography demonstrated a large mobile vegetation,measuring 20x15 mm. on both the anterior and posterior leaflets of the mitral valve with severe mitral regurgitation, mild tricuspid valve regurgitation and mild pulmonary hypertension. During admission, she had received parenteral antibiotic but her consciousness was deteriorated and developed right hemiplegia. She had completed recovery without residual neurologic deficit in 48 hours.

The computed tomography (CT scan) of brain demonstrated acute cerebral infarction without definite haemorrhage. She was diagnosed as active mitral valve IE accompanied with neurological embolic complication and congestive heart failure. European System for Cardiac Operative Risk Evaluation II grade was 5%.

After discussion and received inform consent from the patient, the urgency surgical intervention was done by 9 days after the neurologic event to prevent further cerebral embolism.

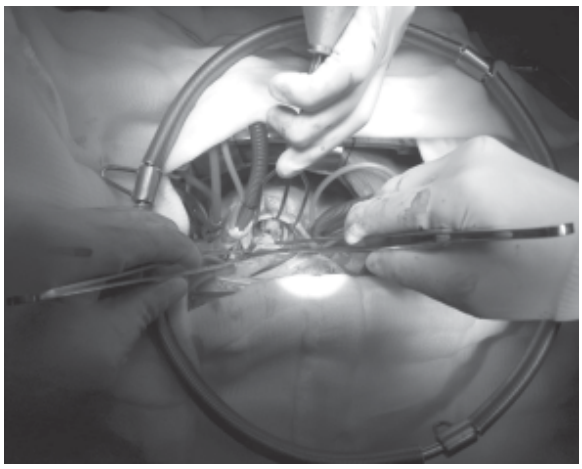

Figure 1: Large vegetation at A3, C2 and P3 segment of mitral valve

Cardiopulmonary bypass was established with ascending aortic cannulation, bicaval venous cannulation for drainage with mild systemic hypothermia. Mitral valve was explored through interatrial groove. Multiple vegetations and perforation were found on the anterior A3 segment, posterior commissure C2 and posterior P3 segment of the mitral valve. (fig. 1) The periannular space abscesses were also identified at C2 and P3. The mitral annulus was slightly dilatation. There was no evidence of rheumatic heart disease. The infected and necrotic tissue of all the A3,C2 and P3 segments were debrided. The fresh autologous pericardium was tailored in C shape to reconstruct the defect (A3, C2 and P3), sutured with 5-0 polypropylene , interrupted in fashion. The pericardium patch at middle part (commissure area) was imbricated to made the new commissure, C2. Fortunately, the artificial chords which had been planned if a prolapse remained present following resection and suture,were not to use (fig.2). Because the mitral annulus was slightly dilated, so the # 28 Profile 3D Ring was implanted for remodeling the annulus and improving the surface of coaptation. A saline water test revealed no prolapse with trivial MR. Cardiopulmonary bypass time was 192 min. and myocardial ischemic time was 167 min. The mitral valve was shown in good competent by transesophageal echocardiography. Total ventilated support time was 13 hours and the time of staying in the intensive care unit was 4.5 days. This patient had received 6 weeks of postoperative intravenous cloxacillin. 7 days after the operation, she was discharged and transferred to local hospital. Echocardiography at discharge, mitral valve function was competent with no mitral regurgitation and mild tricuspid regurgitation was found. The follow up at 4 months post-surgery, she was well being in NYHA class I clinical condition.

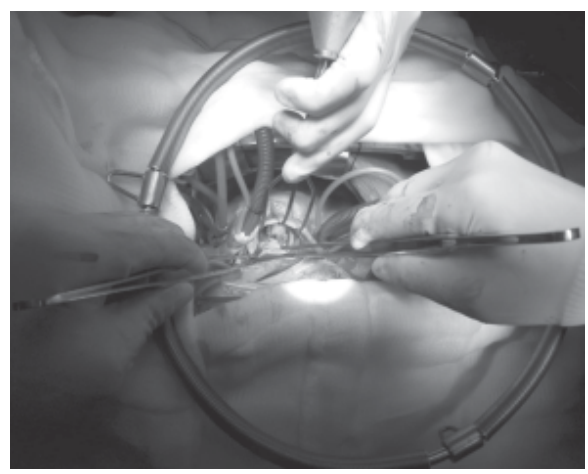

Figure 2 The mitral valve configuration after saline water test.

Discussion

General principles for successful treatment of IE relies on microbial eradication by antimicrobial drugs and surgery for total removal of infected tissues, draining abscesses and reconstruction of cardiac morphology, including repair or replacement of the affected valve. Surgical treatment is required in approximately half of the patients with IE because of severe complications.[9] The optimal time of valve surgery in patients with IE still remains unclear. In fact, the definition of early surgery varied among the included studies, from 'operation during initial hospitalization' to 'operation within 30 days after diagnosis of IE'. Previous studies defined early or urgent cardiac operation as a procedure performed before termination of antibiotic treatment.[10, 11] Reasons to consider early surgery in the active phase (i.e. while the patient is still receiving antibiotic treatment) are to avoid progressive heart failure and irreversible structural damage caused by severe infection and to prevent systemic embolism.[12] ***S. aureus*** IE is associated with a poor prognosis. It is more severe than the IE from other pathogens (excluding fungal pathogens) and high mortality rate of 30% to 46%[13-16] and even reaching 71% in a study published in 1986.[17] The revised 2015 European Society of Cardiology guideline[18] recommended heart failure, uncontrolled infection and prevention of embolism as main indications for early surgery. Whereas the 2014 American College of Cardiology-American Heart Association guidelines[19] recommended valve dysfunction causing heart failure, antibiotic resistant organism, heart block, abscess and persistent infection as important indications for early surgery.

The 2 main approaches for mitral valve surgery are repair and replacement. For noninfective valvular disease, the literature suggested that mitral valve repair had better outcomes than replacement[20, 21] and for infective valvular disease, repair also had better outcomes.[22, 23] Mitral valve replacement has been the standard surgical therapy for patients with mitral valve endocarditis. MV replacement with extensive debridement of leaflet and subvalvular tissues results in the loss of annular-chordal-papillary muscle continuity and deterioration of LV geometry and function. More recently, attempts have been undertaken to repair the mitral valve in infective endocarditis, aiming at an improved postoperative and long-term outcome. A systematic review of 24 studies also found mitral valve repair had better hospital and long-term outcomes than mitral valve replacement for endocarditis.[24] The main reason was that leaflet resection should be completed to remove all the infective tissue, but reconstruction after extensive leaflet resection required complex repair with a large patch including both anterior and posterior leaflets and artificial chords. The feasibility of repairing infected mitral valves for acute endocarditis has been demonstrated to vary from 33% to 78%[25-29]. The durability of mitral valve repair in infective endocarditis has also been questioned. The recent systemic review[30] demonstrated low rates of early and late repeat mitral valve surgery (2.2% and 4.7%, respectively) after mitral valve repair, suggesting a favorable long-term durability. Ruttmann and colleagues[23] reported actuarial freedom from recurrence of endocarditis of 96.4% at 5 years after MV repair and 82.7% after MV replacement. Embolic events are a frequent and life-threatening complication of IE related to the migration of cardiac vegetations. The brain and spleen are the most frequent sites of embolism in left-sided IE. Stroke is a severe complication and is associated with increased morbidity and mortality.[31] Several factors are

associated with increasing risk of embolism, including the size and mobility of vegetations, previous embolism and type of organism. Patients with vegetations > 10 mm in length are at higher risk of embolism[32] and this risk is even higher in patients with larger (> 15 mm) and mobile vegetations, especially in staphylococcal IE affected the mitral valve.[33] However, the risk of new events (occurring after initiation of antibiotic therapy) is only 6-21%.[34] A study from the ICE group[35] demonstrated that the incidence of stroke in patients receiving appropriate antimicrobial therapy was 4.8/1000 patient-days in the first week of therapy, falling to 1.7/1000 patient-days in the second week, and further thereafter. Overall, embolic risk is very high in IE, with embolic events occurring in 20-50% of patients but symptomatic neurological complications occur in 15-30% of patients with IE and are mainly the consequence of embolism from vegetations.[36] Clinical presentation is variable and may include multiple signs and symptoms in the same patient, but focal signs predominate and ischaemic strokes are most commonly diagnosed. Transient ischaemic attack, intracerebral or subarachnoidal haemorrhage, brain abscess, meningitis and toxic encephalopathy are also seen. The additional clinically silent cerebral embolisms occur in 35-60% of IE patients.[37] Following a neurological event, the indication for cardiac surgery often remains or is strengthened, but must be balanced with perioperative risk and postoperative prognosis.

Previous studies reported that surgical intervention in patients with recent onset (≤ 4 weeks) of brain infarction or hemorrhage was associated with the risk of exacerbation of cerebral complications.[38] However, the risk of postoperative neurological deterioration is low after a silent cerebral emboli or transient ischaemic attack and surgery is recommended without delay if the indication remains.[39] If cerebral haemorrhage has been excluded by cranial CT and neurological damage is not severe (i.e. coma), surgery indicated for heart failure, uncontrolled infection, abscess or persistent high embolic risk should not be delayed and can be performed with a low neurological risk (3-6%) and good probability of complete neurological recovery.[40]

This case report was the patient who had severe mitral regurgitation from infective endocarditis due to *S. aureus* with previous 9 days recovered neurologic event and satisfied result of MV repair. In conclusion, the MV repair was feasible in patients with active IE, resulted in normal mitral valve function and thus contributes to better long-term outcomes.

เอกสารอ้างอิง

1. Lalani T, Cabell CH, Benjamin DK, Lasca O, Naber C, Fowler VG Jr. et al. Analysis of the impact of early surgery on in-hospital mortality of native valve endocarditis: use of propensity score and instrumental variable methods to adjust for treatment-selection bias. Circulation 2010;121:1005-13.
2. Hogevik H, Olaison L, Andersson R, Lindberg J, Alestig K. Epidemiologic aspects of infective endocarditis in an urban population. A 5-year prospective study. Medicine (Baltimore) 1995;74(6):324-39.
3. Smith RH, Radford DJ, Clark RA, Julian DG. Infective endocarditis: a survey of cases in the South-East region of Scotland, 1969-72. Thorax. 1976;31(4):373-9.
4. van der Meer JT, Thompson J, Valkenburg HA, Michel MF. Epidemiology of bacterial endocarditis in The Netherlands. I. Patient

characteristics. Arch Intern Med. 1992 ;152(9):1863-8.

5. Mylonakis E, Calderwood SB. Infective endocarditis in adults. N Engl J Med. 2001;345(18):1318-30.
6. David TE, Gavra G, Feindel CM, Regesta T, Armstrong S, Maganti MD. Surgical treatment of active infective endocarditis: a continued challenge. J Thorac Cardiovasc Surg 2007;133(1):144-9.
7. Latham RH. Medical therapy versus early surgical intervention in patients with endocarditis and vegetations seen on echocardiography. South Med J 1991; 84(11):1347-51.
8. Larbalestier RI, Kinchla NM, Aranki SF, Couper GS, Collins JJ Jr, Cohn LH. Acute bacterial endocarditis. Optimizing surgical results. Circulation 1992;86(5 Suppl): II68-74.
9. Tornos P, Iung B, Permanyer-Miralda G, Baron G, Delahaye F, Gohlke-BärwolfCh, et al. Infective endocarditis in Europe: lessons from the Euro heart survey. Heart 2005;91(5):571-5.
10. Aksoy O, Sexton DJ, Wang A, Pappas PA, Kourany W, Chu V, et al. Early surgery in patients with infective endocarditis: a propensity score analysis. Clin Infect Dis 2007;44(3):364-72.
11. Revilla A, López J, Vilacosta I, Villacorta E, Rollán MJ, Echevaria JR, et al. Clinical and prognostic profile of patients with infective endocarditis who need urgent surgery. Eur Heart J 2007;28(1):65-71.
12. Thuny F, Beurtheret S, Mancini J, Gariboldi V, Casalta JP, Riberi A, et al. The timing of surgery influences mortality and morbidity in adults with severe complicated infective endocarditis: a propensity analysis. Eur Heart J 2011;32(16):2027-33.
13. Hoen B, Alla F, Selton-Suty C, Beguinot I, Bouvet A, Briancon SJ. Changing profile of infective endocarditis (Results of a 1-year survey in France). JAMA 2002;288:75-81
14. Sanabria TJ, Alpert JS, Goldberg R, Pape LA, Cheeseman SH. Increasing frequency of staphylococcal infective endocarditis. Experience at a university hospital, 1981 through 1988. Arch Intern Med 1990;150 (6):1305-9.
15. Mourvillier B, Trouillet JL, Timsit JF, Baudot J, Chastre J, Régnier B, et al. Infective endocarditis in the intensive care unit: clinical spectrum and prognostic factors in 228 consecutive patients. Intensive Care Med 2004;30(11):2046-52.
16. Wolff M, Witchitz S, Chastang C, Régnier B, Vachon F. Prosthetic valve endocarditis in the ICU. Prognostic factors of overall survival in a series of 122 cases and consequences for treatment decision. Chest 1995;108(3):688-94.
17. Espersen F, Frimødt-Moller N. Staphylococcus aureus endocarditis. A review of 119 cases. Arch Intern Med 1986;146(6): 1118-21.
18. Habib G, Lancellotti P, Antunes MJ, Bongiorni MG, Casalta JP, Del Zotti F, et al. 2015 ESC Guidelines for the management of infective endocarditis: The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM).Eur Heart J 2015;36(44):3075-128.

19. Nishimura RA, Otto CM, Bonow RO, Carabello BA, Erwin JP III., Guyton RA et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: executive summary: a report of the American College of Cardiology/ Americãn Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol 2014; 63:2438–88.
20. Thourani VH, Weintraub WS, Guyton RA, Jones EL, Williams WH, Elkabbani S, et al. Outcomes and long-term survival for patients undergoing mitral valve repair versus replacement: effect of age and concomitant coronary artery bypass grafting. Circulation 2003;108(3):298-304.
21. Shuhaiber J, Anderson RJ. Meta-analysis of clinical outcomes following surgical mitral valve repair or replacement. Eur J Cardiothorac Surg 2007;31(2):267-75.
22. Muehrcke DD, Cosgrove DM 3rd, Lytle BW, Taylor PC, Burgar AM, Durnwald CP, et al. Is there an advantage to repairing infected mitral valves? Ann Thorac Surg 1997;63(6): 1718-24.
23. Ruttmann E, Legit C, Poelzl G, Mueller S, Chevtchik O, Cottogni M, et al. Mitral valve repair provides improved outcome over replacement in active infective endocarditis. J Thorac Cardiovasc Surg 2005;130(3): 765-71.
24. Feringa HH, Shaw LJ, Poldermans D, Hoeks S, van der Wall EE, Dion RA, et al. Mitral valve repair and replacement in endocarditis: a systematic review of literature. Ann Thorac Surg 2007;83(2):564-70.
25. Iung B, Rousseau-Paziaud J, Cormier B, Garbarz E, Fondard O, Brochet E, et al. Contemporary results of mitral valve repair for infective endocarditis. J Am Coll Cardiol 2004;43(3):386-92.
26. Sternik L, Zehr KJ, Orszulak TA, Mullany CJ, Daly RC, Schaff HV. The advantage of repair of mitral valve in acute endocarditis. J Heart Valve Dis 2002;11(1):91-7.
27. Lee EM, Shapiro LM, Wells FC. Conservative operation for infective endocarditis of the mitral valve. Ann Thorac Surg1998 ;65(4): 1087-92.
28. Wilhelm MJ, Tavakoli R, Schneeberger K, Hörstrupp S, Reuthebuch O, Seifert B, et al. Surgical treatment of infective mitral valve endocarditis. J Heart Valve Dis 2004; 13(5):754-9.
29. Mihaljevic T, Paul S, Leacche M, Rawn JD, Aranki S, O'Gara PT, et al. Tailored surgical therapy for acute native mitral valve endocarditis. J Heart Valve Dis 2004;13 (2): 210-6.
30. Feringa HH, Shaw LJ, Poldermans D, Hoeks S, van der Wall EE, Dion RA, et al. Mitral valve repair and replacement in endocarditis: a systematic review of literature. Ann Thorac Surg 2007;83(2): 564-70.
31. Thuny F, Avierinos JF, Tribouilloy C, Giorgi R, Casalta JP, Milandre L, et al. Impact of cerebrovascular complications on mortality and neurologic outcome during infective endocarditis: a prospective multicentre study. Eur Heart J 2007;28(9):1155-61.
32. Thuny F, Di Salvo G, Belliard O, Avierinos JF, Pergola V, Rosenberg V, et al. Risk of embolism and death in infective endocarditis: prognostic value of echocardiography: a prospective multicenter study. Circulation 2005;112:69-7533.

33. Shiue AB, Stancoven AB, Purcell JB, Pinkston K, Wang A, Khera A, et al. Relation of level of B-type natriuretic peptide with outcomes in patients with infective endocarditis. Am J Cardiol 2010;106: 1011-5.
34. Vilacosta I, Graupner C, San Roman JA, Sarria C, Ronderos R, Fernandez C, et al. Risk of embolization after institution of antibiotic therapy for infective endocarditis. J Am Coll Cardiol 2002;39:1489-95.35.
35. Dickerman SA, Abrutyn E, Barsic B, Bouza E, Cecchi E, Moreno A, et al. The relationship between the initiation of antimicrobial therapy and the incidence of stroke in infective endocarditis: an analysis from the ICE Prospective Cohort Study (ICE-PCS). Am Heart J 2007;154(6):1086-94.
36. King JM, Kulhankova K, Stach CS, Vu BG, Salgado-Pabón W. Phenotypes and Virulence among Staphylococcus aureus USA100, USA200, USA300, USA400, and USA600 Clonal Lineages. mSphere 2016;1(3). pii: e00071-16.
37. Snygg-Martin U, Gustafsson L, Rosengren L, Alsïo A, Ackerholm P, Andersson R, et al. Cerebrovascular complications in patients with left-sided infective endocarditis are common: a prospective study using magnetic resonance imaging and neurochemical brain damage markers. Clin Infect Dis 2008;47(1):23-30.
38. Gillinov AM, Shah RV, Curtis WE, Stuart RS, Cameron DE, Baumgartner WA, et al. Valve replacement in patients with endocarditis and acute neurologic deficit. Ann Thorac Surg 1996 ;61(4):1125-9.
39. Thuny F,Avierinof JF, Tribouilloy C, Giorgi R,Casalta JP, Milandre L, et al. Impact of cerebrovascular complications on mortality and neurologic outcome during infective endocarditis: a prospective multicenter study. Eur Heart J 2007;28: 1155-61
40. Ruttmann E, Willeit J, Ulmer H, Chevtchik O, Höfer D, Poewe W, et al. Neurological outcome of septic cardioembolic stroke after infective endocarditis. Stroke 2006; 37(8):2094-9.