Case Report

Echocardiographic Features in *Streptococcus agalactiae* Endocarditis: Four Cases Report

Orathai Pachirat MD*, Sompop Prathani MD*,
Viraphong Lulitanond PhD*, George Watt MD**

** Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand*
*** International Emerging Infections Program (IEIP), Thailand MOPH – US CDC Collabolation, Nontaburi, Thailand*

Objective: *Streptococcus agalactiae endocarditis is uncommon compared to other types of streptococcal endocarditis. The aim of this study was to describe the echocardiographic features of S. agalactiae endocarditis.*
Material and Method: *Between January 2010 and December 2012, 150 patients diagnosed with infective endocarditis by the modified Duke criteria treated at Srinagarind Hospital and Queen Sirikit Heart Center, Khon Kaen University were included. The transthoracic echocardiography (TTE) was performed on every patient.*
Results: *Four patients with S. agalactiae endocarditis were identified. The TTE features included one patient with a huge, highly mobile vegetation at the mitral position and patient presented with acute embolic stroke. Two patients with highly mobile vegetations at the aortic position and destroyed aortic cusps, both patients presented with congestive heart failure. One patient with vegetation at mechanical valve, mitral position and patient presented with congestive heart failure. All four patients underwent a combined medical and surgical therapy. A correlation between the echocardiographic features and surgical findings in all but two patients, fewer abscesses were found by surgery.*
Conclusion: *In the setting of acute endocarditis, the detection of large vegetation and severely destroyed valve by echocardiography is an argument in favor of S. agalactiae endocarditis and may warrant early surgical intervention.*

Keywords: *Streptococcus agalactiae, Infective endocarditis, Echocardiography*

J Med Assoc Thai 2014; 97 (1): 118-22
Full text. e-Journal: *http://www.jmatonline.com*

Echocardiography is an extremely important tool in the diagnosis of infective endocarditis (IE). *Streptococcus agalactiae* endocarditis is a rare clinical entity; however, its prevalence has increased over the last decade[1,2,16]. The typical patient with *S. agalactiae* endocarditis in the pre-antibiotic era was a young women with mitral valve disease who was pregnant. Currently the disease has been found in non-pregnant adult patients, the elderly and patients with chronic immunosuppressive diseases such as alcoholism, diabetes mellitus, malignant neoplasms, and HIV infection[3]. However, the echocardiographic features of *S. agalactiae* endocarditis are not well known because scanty information is available in the literature. The purpose of this report is to present the echocardiographic features that the authors observed in four patients with *S. agalactiae* endocarditis.

Correspondence to:
Pachirat O, Cardiovascular Unit, Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand.
Phone: 043-363-746
E-mail: orathai@hotmail.com

Material and Method

This was a prospective study of IE that ran between January 2010 and December 2012 at Srinagarind Hospital and Queen Sirikit Heart center, Khon Kaen University, a teaching hospital and tertiary care facility in Northeast Thailand[4]. The authors created a database from the epidemiological laboratory, clinical, microbiological, echocardiographic features, and treatment modalities for 150 patients who underwent echocardiography for suspected IE and diagnosed according to the modified Duke criteria[5]. Four of these patients had *S. agalactiae* endocarditis for which a routine blood culture failed to identify as the causative organism in three patients. *S. agalactiae* endocarditis was subsequently confirmed by PCR (a molecular technique) on valve tissue removed by surgery[6].

Echocardiography

All patients underwent transthoracic echocardiographic (TTE) study, in order to obtain diagnosis. Transesophageal echocardiography (TEE) was done in order to obtain more detailed informations (regarding, paravalvular structures,

perivalvular abscesses, and perforation of valve leaflets).

Vegetation is the hallmark of IE. On TTE examination, they were characterized as oscillating mass attached to valve leaflets or other endothelial surface along regurgitation jet[7].

Results

The clinical characteristics of the four patients are shown in Table 1. Three patients had native valve IE and one patient had prosthetic valve IE. The mean age was 39 years. Three patients were female. None of the patients had underlying chronic diseases.

Echocardiographic findings

The left ventricular function was normal in all patients. Aortic valve involvement was present in two patients and mitral valve in one. A mechanical valve in mitral position was present in one (Table 2). The vegetation was large and highly mobile in one patient (Fig. 1). The mean size of vegetations was 18 mm (range, 10-35 mm). The vegetation caused obstruction in one patient. Destruction and destroyed of non-coronary cusp (NCC) of the aortic valve was present in two patients (Fig. 2).

Surgical findings

Cardiac surgery was required in our patients due to heart failure and large vegetation. Surgical findings were available in all four patients. Complete destruction of the NCC of the aortic valve with annular abscesses was observed in two patients. A huge vegetation attached at posterior mitral leaflet was present in one patient. There was a correlation between the TTE and surgical findings in two patients (50%). TTE could not identify the annular abscess in the aortic valve IE. Surgery was successful in all four patients and all were alive after two years of follow-up.

Discussion

S. agalactiae has remained an uncommon cause of acute IE[8,9,13,14]. It is an aggressive disease with a high rate of local and systemic complications. Furthermore, it is now well known that there is an association between *S. agalactiae* IE and chronic underlying systemic diseases[8,9]. In contrast with the authors' findings, no underlying condition was detected in all patients. Surgical intervention is usually required due to heart failure and emboli[16]. Seventy five percent of our patients underwent surgery because of severe valve destruction and heart failure. The incidence of emboli was also very high (50%) due to the large size (>10 mm) of vegetation[15,16]. One of our patients had a large vegetation and presented with embolic stroke.

In the literature review, the overall mortality rate for *S. agalactiae* IE remained high[1,3,9,16], despite having undergone surgery. Its clinical and outcome are markedly different from IE caused by other

Table 1. Clinical characteristics of 4 patients with *Streptococcus agalactiae* endocarditis

Patient	Age	Sex	Valve involve	Underlying disease	Surgery	Complications	Outcome (after 2 years)
1	42	Female	Aortic	No	Valve replacement	CHF	Recovery
2	24	Male	Mitral	No	Valve replacement	Stroke	Recovery
3	54	Female	MVR	No	Prosthetic replace	CHF	Recovery
4	36	Female	Aortic	No	Valve replacement	CHF	Recovery

MVR = mitral valve replacement; CHF = congestive heart failure

Table 2. Echocardiographic features of the 4 patients

Patient	Vegetations	Size (cm)	Mobility	Morphology	Abscess	Perforation	Regurgitation
1	One	1.1*0.3	+++	Large vegetaion	No	AV (NCC)	Severe AR
2	Two	3.5*2.5 0.8*0.4	+++	Large, highly mobile vegetation on posterior leaflet and a small one at anterior leaflet of mitral valve	No	No	Moderate MR
3	One	1.0*1.0	+++	Sessile vegetation	No	No	Moderate MR
4	One	1.1*0.2	+++	Sessile vegetation	No	AV (NCC)	Severe AR

AV = aortic valve; NCC = non coronary cusp; AR = aortic regurgitation; MR = mitral regurgitation; +++ = highly mobile

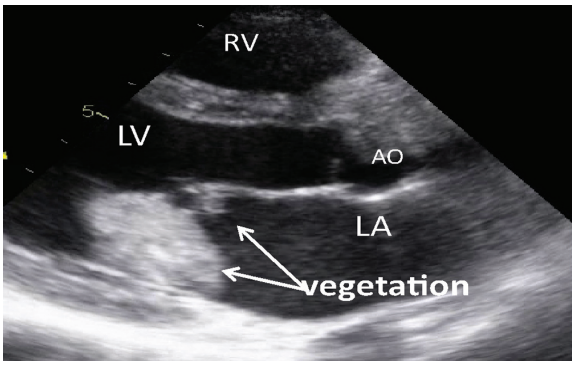

Fig. 1 Transthoracicechocardiography showed large, highly mobile vegetation attached at posterior mitral leaflet and small one at anterior mitral leaflets.

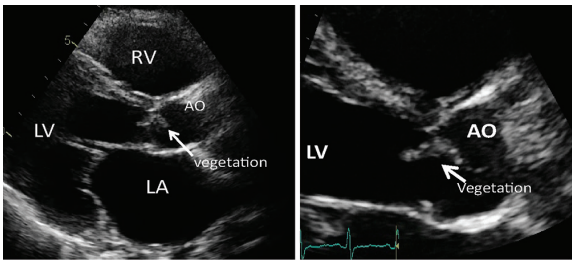

Fig. 2 Transthoracic echocardiography showed a vegetation attached at aortic valve with destroyed aortic cusp.

streptococci, (particularly *S. viridians*) that have shown a decreased mortality rate.

In general, strains of *S. agalactiae* are slightly more resistant to penicillin than other strains of streptococci; thus, an aminoglycoside must be added during the first two weeks of treatment, which should last four to six weeks[8,9,14].

The echocardiography has become a mainstay in the diagnosis of IE, TTE alone is often sufficient to establish the diagnosis, as demonstrated by Lengyel, who found that TTE and TEE findings were concordant in 83% of the cases[11]. In the subgroup of patients with prosthetic valve IE, TEE is preferable[12]. The large size of vegetations, their friability may explain the high rate of emboli[15]. The lack of fribinolysin production in vegetations might also account for the pathogenesis of this complication[16].

There are many reports on *S. agalactiae* endocarditis[13-20] but none describes the echocardiographic features. In this present study, diagnosis in all patients was accomplished by a TTE examination. The TEE examination is superior for defining the extent of infection such as abscesses and other evidence of tissue destruction. Two patients in this present study with aortic valves involvement TTE underestimated the extent of infection as verified by surgery. This may have been related to the severity of the aortic cusp destruction and consequent severe valvular regurgitation. Emergency surgical intervention was performed due to severe congestive heart failure and TEE could not be performed before surgery.

In summary, the clinical and echocardiographic features are (a) onset of disease was acute, (b) vegetations were large (>10 mm in diameter), and (c) valve destruction with severe valvular regurgitation and abscesses formation.

Conclusion

In the setting of acute endocarditis, the detection of large vegetation and severely destroyed valves by echocardiography is an argument in favor of *S. agalactiae* endocarditis. Early surgical intervention is associated with a better long-term outcome.

Acknowledgement

The authors thank (a) the patients for their participation; (b) the following investigators for their invaluable help with this study: Pierre-Edouard Fournier and Didier Raoult; from the University of the Mediterranean, Marseille, France, Henry Baggett, Susan A Maloney, Michael Kosoy, Saithip Bensri and Somsak Thamthitiwat; from the Division of Vector Borne Infectious Diseases, Centers of Disease Control and Prevention, Fort Collins, Colorado, from the National centers for Zoonotic, Vector-Borne, Enteric Diseases, CDC, Atlanta and from IEIP, Nonthaburi, Thailand. (c) Anucha Paupairoj, Nongrak Ud-Ai from the Faculty of Medicine for their support and (d) Mr. Bryan Roderick Hamman for his assistance with the English-language presentation.

Potential conflicts of interest

None.

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ลักษณะคลื่นเสียงสะท้อนหัวใจในโรคเยื่อบุหัวใจอักเสบจากเชื้อสเตร็ปโตค็อกคัส อะกาแลกเทียร: รายงานผู้ป่วย 4 ราย

อรทัย พาชีรัตน์, สมภพ พระธานี, วีระพงศ์ ลุลิตานนท์, จอจส์ วัตต์

วัตถุประสงค์: *โรคเยื่อบุหัวใจอักเสบจากเชื้อสเตร็ปโตค็อกคัส อะกาแลกเทียรเป็นโรคที่พบไม่บ่อยเมื่อเปรียบเทียบกับเชื้อสเตร็ปโตค็อกคัสกลุ่มอื่น ๆ ที่ทำให้เกิดโรคนี้ การศึกษานี้เพื่อที่จะแสดงให้เห็นถึงลักษณะคลื่นเสียงสะท้อนหัวใจของโรคเยื่อบุหัวใจอักเสบจากเชื้อดังกล่าว*

วัสดุและวิธีการ: *ตั้งแต่เดือนมกราคม พ.ศ. 2553 ถึง เดือนธันวาคม พ.ศ. 2555 พบผู้ป่วย 150 ราย ที่ได้รับการวินิจฉัยว่าเป็นโรคเยื่อบุหัวใจอักเสบโดยใช้ modified Duke criteria นอนรักษาที่โรงพยาบาลศรีนครินทร์ และศูนย์หัวใจสิริกิติ์ มหาวิทยาลัยขอนแก่น ผู้ป่วยทุกรายได้รับการตรวจคลื่นเสียงสะท้อนหัวใจ*

ผลการศึกษา: *ผู้ป่วย 4 ราย ได้รับการวินิจฉัยว่าเป็นโรคเยื่อบุหัวใจอักเสบจากเชื้อสเตร็ปโตค็อกคัส อะกาแลกเทียร การตรวจคลื่นเสียงสะท้อนหัวใจพบว่าผู้ป่วย 1 ราย มี vegetation ขนาดใหญ่มากแกว่งไปมาติดที่ลิ้นหัวใจไมตรัล ผู้ป่วยมาโรงพยาบาลด้วยภาวะหลอดเลือดสมองอุดตัน ผู้ป่วย 2 ราย มี vegetations ขนาดใหญ่ที่ลิ้นหัวใจตำแหน่งเอออติก ร่วมกับมีการทำลายลิ้นหัวใจอย่างรุนแรง ผู้ป่วยทั้งสองมาโรงพยาบาลด้วยภาวะหัวใจล้มเหลว ผู้ป่วยรายที่ 4 พบ vegetation ที่ลิ้นหัวใจเทียมตำแหน่งไมตรัล ผู้ป่วยมาโรงพยาบาลด้วยภาวะหัวใจล้มเหลว ผู้ป่วยทั้ง 4 ราย ได้รับการผ่าตัดเปลี่ยนลิ้นหัวใจซึ่งผลการผ่าตัดพบพยาธิสภาพเหมือนการตรวจด้วยคลื่นเสียงสะท้อนหัวใจ แต่มีผู้ป่วย 2 ราย พบฝีเล็ก ๆ ที่ลิ้นหัวใจเอออติก ที่ไม่พบจากการตรวจด้วยคลื่นเสียงสะท้อนหัวใจ*

สรุป: *ผู้ป่วยที่มาด้วยโรคเยื่อบุหัวใจอักเสบชนิดเฉียบพลัน การตรวจพบ vegetation ที่มีขนาดใหญ่และทำลายลิ้นหัวใจ มีการดำเนินโรคที่รุนแรง สนับสนุนว่าน่าจะเกิดจากเชื้อสเตร็ปโตค็อกคัส อะกาแลกเทียร การรักษาด้วยการผ่าตัดจึงอาจมีความจำเป็น*