Infective endocarditis

Infective endocarditis is universally fatal if unrevealed and untreated. Heart failure due to acquired valvular incompetence or abscesses, frequent embolic phenomena from vegetations to several organs including the brain are responsible for death and permanent sequelae after cured infections. Problems of special concern are prosthetic valve endocarditis - difficult to diagnose and often in need of combined surgical and medical treatment.

Research programs covering different aspects of infective endocarditis have been performed at our institution since 1980’s covering epidemiology in an urban area, different aspects of antibiotic therapy, surgical interventions, cerebral embolism, culture negative cases, prosthetic heart valve infections. Our institution is since 1995 in charge of a national registry of all cases of infective endocarditis treated at swedish depts of infectious diseases, has produced national guidelines for diagnosis and treatment, and participate in the steering committee of International Collaboration on endocarditis (ICE). ICE performs a world-wide (63 sites) scientific collaboration involving different aspects of infective endocarditis.

Main scientific projects at our institution are:

I Cerebral complications in infective endocarditis

Cerebral embolization with influence of protective and risk factors with focus on antiplatelet and anticoagulant therapy are main subjects of study. A collaboration with Rigshospitalet and Gentofte hospital in Copenhagen has been established. Studies with magnetic resonance imaging and brain damage markers showed a higher than expected cerebral embolization rate. Incidence of cerebral embolization/hemorrhage/infection is investigated by cerebral MRT, cerebrospinal fluid neurochemical damage markers and cultures. Risk factors and indications for acute heart surgery are evaluated. Does anti-platelet therapy decrease embolization rate? Does coumadin therapy increase risk of cerebral bleeding?

Researchers

Dr Ulrika Snygg-Martin, MD, PhD, specialist in infectious diseases, Sahlgrenska University Hospital defended her thesis in June 2009 on Cerebral complications in infective endocarditis (Institute of Biomedicine, Sahlgrenska Academy). Lars Olaison was main supervisor.
Dr NE Bruun, MD, PhD and Dr RV Rasmussen, PhD-student, Dept of Cardiology, Gentofte University Hospital, Copenhagen and Dr C Hassager, MD, PhD, Dept of Cardiology, Rigshospitalet University Hospital, Copenhagen

Publications

**Cerebrovascular complications in patients with left-sided infective endocarditis are common: a prospective study using magnetic resonance imaging and neurochemical brain damage markers.**  

Rasmussen RV, Snygg-Martin U, Olaison L, Buchholtz K, Larsen CT, Hassager C, Bruun NE.  
**Major cerebral events in Staphylococcus aureus infective endocarditis: is anticoagulant therapy safe?**  

**One-year mortality in coagulase-negative Staphylococcus and Staphylococcus aureus infective endocarditis.**  

Snygg-Martin U, Rasmussen RV, Hassager C, Bruun NE, Andersson R, Olaison L  
**The influence of warfarin treatment on cerebrovascular complications in left-sided infective endocarditis**  
Submitted 2009

Snygg-Martin U, Rasmussen RV, Hassager C, Bruun NE, Andersson R, Olaison L  
**The relationship between cerebrovascular complications and established use of antiplatelet therapy: A cohort study of the effects in left-sided infective endocarditis**  
Submitted 2009
Cerebral complications in infective endocarditis
Thesis at the Institute of Biomedicine, Sahlgrenska Academy.
June 8 2009

II Prosthetic valve endocarditis

Diagnosis of this disease and it’s common complication abscess formation is difficult even for experienced readers of transesophageal echocardiography. A new tool is ECG-gated cardiac computed tomography. A prospective study of all patients with aortic prosthetic valve endocarditis from Västra Götaland region started 2008. Study of all patients for risk factors that supports or contraindicates acute valvular surgery. Study of aortic allografts as prosthesis substitute. Long-term follow-up study of all patients from 1995 and forward with emphasis on survival, relapse, late valvular infections, need of prosthesis exchange. Study of different antibiotic treatment regimens.

Researchers
Mattias Ericsson, MD, training for specialist degree in infectious diseases, PhD-student with focus on prosthetic valve endocarditis. Lars Olaison main supervisor
Gunnar Svensson, MD, PhD, Dept of Cardiothoracic surgery, supervisor for prosthetic valve surgery, Sahlgrenska University Hospital
Agneta Flinck, MD, PhD, Dept of Radiology, Sahlgrenska University Hospital
Carl Lamm, MD, Dept of Radiology, Sahlgrenska University Hospital
Erika Fagman, MD, Dept of Radiology, Sahlgrenska University Hospital
Odd Bech-Hansen, MD, PhD, Dept of Clinical Physiology, Sahlgrenska University Hospital

Publications:
ECG-gated cardiac computed tomography: A new imaging modality in the diagnosis of aortic prothetic valve endocarditis
Submitted 2010

III Cardiac device infections.
Evaluation of a new strategy with extraction and reimplantation of devices. Study of different treatments regimens for local infections. Explore levels of bacterial growth and biofilm on electro-extracted electrodes due to local infections.

Researchers:
Charles Kennergren, MD, PhD, Dept of Cardiothoracic surgery, Sahlgrenska University Hospital, supervisor for pacemaker devices surgery, head of national centre for laser assisted pacemaker cable extractions.

Publications:
Kennergren C.
Cardiac implantable electronic device treatment: taking care of complications.

Kennergren C, Bjurman C, Wiklund R, Gäbel J.
A single-centre experience of over one thousand lead extractions.

Laser-assisted lead extraction: the European experience.

Rundström H, Kennergren C, Andersson R, Alestig K, Hogevik H.
Pacemaker endocarditis during 18 years in Göteborg.

IV Biochemical markers for inflammation in cardiac stress in infective endocarditis
Analysis of prognostic markers for cardiac stress in infective endocarditis. Serial consecutive serum samples during treatment and follow-up of patients at Dept of Infectious diseases, Sahlgrenska University Hospital are analyzed including NT pro BNP and different cytokines. Different patient groups are studied – dead during treatment, nonsurgery/survived, surgery/survived, posttreatment heart congestion, posttreatment need of valvular surgery.

Researchers:
Michael Fu, MD, PhD, Wallenberg Laboratory, Dept of Cardiology, Sahlgrenska University Hospital
Christian Bjurman, MD, PhD-student. Michael Fu is main supervisor.

V National and international studies
Large patient materials are needed for relevant studies of subgroups divided by leftsided native valve-, prosthetic valve- and rightsided valve endocarditis and also by different microbial etiologies. Göteborg has a leading position in cooperation with Duke University, Durham, NC, USA. National studies have given evidence that shortened aminoglycoside therapy with less nefrotoxic adverse effects can be given in the difficult-to-treat enterococcal endocarditis group. These guidelines are now implemented in Sweden and also included by American Heart Association (AHA) as a promising alternative. Guidelines concerning indications for acute valvular surgery serve as national guidelines and has been published in international journals. Several aspects of antimicrobial therapy, surgical therapy, patient risk categories are studies.

Researchers:
Rune Andersson, MD, PhD, specialist in infectious diseases, internal medicin, Research and Development Center, Skaraborg Hospital
Maria Werner, MD, PhD, specialist in infectious diseases, Dept of Infectious diseases, Borås Hospital. Defended her thesis in Dec 2006 on Blood culture negative endocarditis (Institute of Biomedicine, Sahlgrenska Academy). Harriet Hogevik was main supervisor.
Harriet Hogevik, MD, PhD, specialist in infectious diseases, Uddevalla Hospital
Ralph Corey, MD, PhD, specialist in infectious diseases, Duke University Medical Center, Durham, NC, USA
Bruno Hoen, MD, PhD, specialist in infectious diseases, Dept of Infectious diseases, Hopital Saint-Jacques, Besancon, France
José Miro, MD, PhD, specialist in infectious diseases, Hospital Clinic-Institut d’Investigacions Biomèdiques August Pi I Sunyer, University of Barcelona, Barcelona, Spain

Publications:


**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.**


**Clinical presentation, etiology, and outcome of infective endocarditis in the 21st century: the International Collaboration on Endocarditis-Prospective Cohort Study.**


Werner M, Andersson R, Olaison L, Hogevik H; Swedish Society of Infectious Diseases Quality Assurance Study Group for Endocarditis.

**A 10-year survey of blood culture negative endocarditis in Sweden: aminoglycoside therapy is important for survival.**


**Swedish guidelines for diagnosis and treatment of infective endocarditis.**

**Contemporary clinical profile and outcome of prosthetic valve endocarditis.**  

**Influence of diabetes mellitus on the clinical manifestations and prognosis of infective endocarditis: a report from the International Collaboration on Endocarditis-Merged Database.**  

Maria Werner  
**Blood culture negative endocarditis**  
Thesis at the Institute of Biomedicine, Sahlgrenska Academy.  
Dec 19, 2006

**Use of surgery in patients with native valve infective endocarditis: results from the International Collaboration on Endocarditis Merged Database.**  

**The use and effect of surgical therapy for prosthetic valve infective endocarditis: a propensity analysis of a multicenter, international cohort.**  
Anderson DJ, Olaison L, McDonald JR, Miro JM, Hoen B, Selton-Suty C, Doco-Lecompte T, Abrutyn E, Habib G, Eykyn S, Pappas PA, Fowler VG, Sexton DJ, Almela M, Corey GR, Cabell CH.


Clinical characteristics and outcome of aortic endocarditis with periannular abscess in the International Collaboration on Endocarditis Merged Database.


Staphylococcus aureus native valve infective endocarditis: report of 566 episodes from the International Collaboration on Endocarditis Merged Database.


Enterococcal endocarditis: 107 cases from the international collaboration on endocarditis merged database.


Prognostic factors in 61 cases of Staphylococcus aureus prosthetic valve infective endocarditis from the International Collaboration on Endocarditis merged database.
Olaison L, Pettersson G.

**Current best practices and guidelines. Indications for surgical intervention in infective endocarditis.**

Werner M, Andersson R, Olaison L, Hogevik H.

**A clinical study of culture-negative endocarditis.**

Olaison L, Schadewitz K; Swedish Society of Infectious Diseases Quality Assurance Study Group for Endocarditis.

**Enterococcal endocarditis in Sweden, 1995-1999: can shorter therapy with aminoglycosides be used?**

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Lars Olaison
MD, PhD, associate professor
Dept of infectious diseases
Institute of biomedicine
Sahlgrenska University Hospital
Gothenburg, Sweden
Tel: +46 31 3434239
Cell phone: +46 736 589322
e-mail: lars.olaison@infect.gu.se