Infective Endocarditis at Tertiary Health Care Units

Thesis
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List of abbreviations

AHA	:	American Heart Association
AO	:	Acridine orange
BCS-RCP	:	British Cardiac Society and the Royal College of Physicians of London
BSAC	:	British Society of Antimicrobial Chemotherapy
CFUs	:	Colony-forming units
CHD	:	Congenital heart disease
CoNS	:	Coagulase negative Staphylococci
CRP	:	C-reactive protein
DNA	:	Deoxyribonucleic acid
E.coli	:	Escherichia coli
EDTA	:	Ethylene diamine tetraacetic acid
EM	:	Electron microscope
ESC	:	European Society of Cardiology
ESR	:	Erythrocyte sedimentation rate
ESRD	:	End-stage renal disease
F	:	Females
FISH	:	Fluorescent in situ hybridization
HACEK	:	Haemophilus species, Actinobacillus actinomycetemcomitans, Cardiobacterium hominis, Eikenella corrodens, and Kingella kingae
HF	:	Heart failure
HIV	:	Human immunodefiency virus
IAs	:	Infectious aneurysms
ICU	:	Intensive care unit
IE	:	Infective endocarditis
M	:	Males
MRSA	:	Methicillin Resistance Staph. aureus
N	:	Number
NVE	:	Native valve endocarditis
NBTE	:	Non-bacterial thrombotic endocarditis

PAS	:	Periodic acid-Schiff
PCR	:	Broad-range polymerase chain reaction
PVE	:	Prosthetic valve endocarditis
PCT	:	Serum procalcitonin
RNA	:	Ribonucleic acid
SD	:	Standard deviation
SPS	:	Sodium polyanetholsulphonate
Staph.	:	Staphylococcus
Strept.	:	Streptococcus
TFA	:	Tissue factor activity
TTE	:	Transthoracic echocardiography
US	:	United States

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الملخص العربي

يعد إلتهاب الشغاف الخمجى للقلب وصمامات القلب مرض خطير يؤدى الى الوفاة. لذا يجب سرعة تشخيص هذا المرض وعلاجه .

هدفت هذه الدراسة إلى التعرف على الميكروبات المسببة لإلتهاب الشغاف الخمجى و تحديد نمط المضادات الحيوية اللازمة و بيان دور صبغة الأكريدين البرتقالية في حالات مزارع الدم السالبة.

تمت هذه الدراسة في مستشفيات جامعة عين شمس و معهد القلب القومي في الفترة من يوليه ٢٠٠٧حتي أغسطس ٢٠٠٨على سبعين حالة مصابة بإلتهاب الشغاف الخمجى الذين تم تشخيصهم بالفحص الاكلينيكى والموجات الفوق صوتية على القلب بأنهم حالات اصابة بهذا المرض .

وقد لوحظ أن الرجال أكثر عرضة من السيدات لحدوث المرض (١:٢٫٣) وأن أكثر معدل الإصابة يتراوح بين سن (٢١ -٤٠) عام وأن اقل معدل يتراوح بين سن عام إلى ١٠ أعوام. و لوحظ أيضا ان أهم العوامل المسببة لحدوث هذا المرض هي الحمى الروماتيزمية للقلب تليها تغييرأحد صمامات القلب, وأن أكثر الصمامات تأثرا هو الصمام الأورطي.

وجد ان عدد حالات مزارع الدم الايجابية هو ٥٠ حاله وأن أكثر الميكروبات

المسببة هى (Staph.aureus).

وجد أن التهاب الشغاف الخمجى للقلب على صمام طبيعى قد مثل (٦٨٫٦%) و أن

Staph. aureus و coagulase negative Staph. هما

أكثر الميكروبات المسببة للمرض بالتساوى . وأن التهاب الشغاف الخمجى للقلب على صمام سبق تغييره قد مثل (٣١,٤%) وأن أكثر الميكروبات المسببة هى

Staph. aureus تليها coagulase negative Staphl.

و وجد أن عدد حالات مزارع الدم السلبية هى ٢٠حاله وهى تمثل (٢٨,٦٧%) تم فحص هذه الحالات السلبيه بصبغة الاكريدين ووجد ان عدد ثلاثة حالات بهم ميكروب وهو يمثل (١٥%) وأن ١٧ حالة لا يوجد بهم ميكروب وهو يمثل (٨٥%). لذا ينصح بإستخدام صبغة الأكريدين البرتقالية كطريقة سهلة وسريعة في حالات مزارع الدم السلبية.

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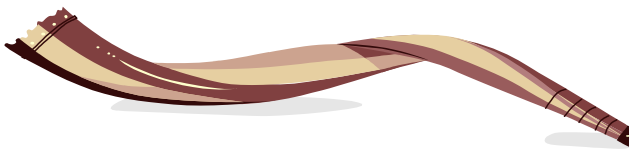

Omaima Ahmed

INTRODUCTION

Infective endocarditis (IE) is a non-contagious infection of the lining of the heart chambers and heart valves, caused by bacteria, fungi, or other infectious agents **(Millar and Moore, 2004).** It remains a relatively rare disease worldwide, with an estimated incidence between 3 and 10 per 100,000 per year **(Habib et al., 2009).** Mortality varies according to the infecting organism (*Staphylococcus aureus* 30- 40%, *viridans Streptococci* 4- 16%, fungal infections over 50%) and is higher when infection affects a prosthetic valve or is complicated by congestive heart failure, abscess formation, or a neurological event **(Mylonakis and Calderwood, 2001; Cabell et al., 2002).**

The risk of infection of heart valves in persons predisposed to acquiring IE increases with the following conditions: congenital heart disease, rheumatic fever, major dental treatment, open heart surgery, and genitourinary procedures. New evidence is growing that changes in social behavior, such as an increase in the incidence of body piercing, excessive alcohol consumption, and the use of intravenous self-administered illicit drugs may also predispose a susceptible person to an increased risk of acquiring endocarditis **(Millar and Moore, 2004).**

The disease has been most commonly seen in older age groups with a predominance of male patients and an increased incidence of acute cases caused by virulent organisms such as Staph. aureus, Gram-negative bacilli and fungi **(Nashmi and Memish, 2007).**

The diagnosis of infective endocarditis requires a multifaceted approach involving clinical suspicion and

examination, laboratory investigation by means of inflammatory markers and microbiological analysis, and imaging with echocardiography **(Beynon, et al., 2006)**.

Transthoracic echocardiography is rapid and noninvasive and has excellent specificity for vegetations (98%) **(Shively et al., 1991).** However, transthoracic echocardiography may be inadequate in up to 20% of adult patients because of obesity, chronic obstructive pulmonary disease, or chest-wall deformities; the overall sensitivity for vegetations may be less than 60 to 70% **(Werner et al., 1996)**. On the other hand, transesophageal echocardiography, although more costly and invasive, increases the sensitivity for detecting vegetations to 75-95% while maintaining the specificity to 85-98% **(Werner et al., 1996; Heidenreich et al., 1999)**.

Given the need for prolonged antibiotic treatment in most patients with IE, positive microbiological cultures and sensitivities are vitally important for successful management. Current guidelines recommend that three sets of blood cultures are drawn one hour apart before the introduction of antibiotic treatment **(Horstkotte et al., 2004).** However, Blood cultures are negative in 2.5-31% of cases of endocarditis, often delaying diagnosis and the start of treatment with profound impact on clinical outcome. Negative cultures are most commonly related to the previous administration of antibiotics **(Hoen et al., 2002)**, but they may also be associated with fastidious pathogens, including Legionella, Coxiella, the HACEK group (Haemophilus species, Actinobacillus actinomycetem-comitans, Cardiobacterium hominis, Eikenella corrodens, and Kingella kingae), and fungi such as Candida, Histoplasma, and Aspergillus species **(Beynon et al., 2006).**

Acridine Orange (AO) stain is a rapid, inexpensive method in detection of culture negative endocarditis. As it could detect fastidious microorganisms and candida which are difficult to be detected by Gram stain or when standard media are used **(Adler et al., 2003).**

Serological assay can detect Coxiella, Brucella, Bartonella, or Chlamydia. Polymerase chain reaction can be used to identify unculturable organisms in excised vegetations or systemic emboli **(Goldenberger et al., 1997).** Specific fluorescent labeled antibody staining and electron microscopy, should be considered in all cases where cultures have tested negative for IE **(Prendergast, 2002).**

AIM OF THE WORK

The aim of the present study was to identify the microbial causes of IE, determine their antimicrobial susceptibility pattern, and to evaluate the role of the acridine orange stain in detecting the presence of microorganisms in cases of blood culture negative endocarditis.