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Infective
Endocarditis

Infective Endocarditis

Sarah Needham on a little known but lethal infection of the heart cavity which is on the increase among drug users

What is it?

Endocarditis is the condition when the inner lining of your heart cavity and valves become inflamed. If this condition has arisen as a result of intravenous drug use it is commonly the right side of the heart affected which includes the tricuspid valves. For intravenous drug using patients this is caused by bacteria which travels from the injection point via the bloodstream to the heart.

Infective endocarditis describes endocarditis that is caused by an infection. The incidence in the UK population is 6-7 per 100,000. However, the research is inconclusive regarding the prevalence of this condition, in respect of intravenous drug users. Although, through my own clinical practice this condition appears to be on the increase and highly prevalent, with at least one of our patients per week being diagnosed and treated. Without treatment mortality approaches 100% and even with treatment there is a significant morbidity and mortality.

What are the symptoms?

Patients may experience the following symptoms: fatigue; weakness; fever; chills; night sweats; weight loss; muscle aches and pains; heart murmur; shortness of breath; looks pale and may be anaemic. One of the main problems is that these symptoms are also characteristic of many other conditions and some are also seen in acute opiate withdrawal. Therefore, medical assessment and investigations are required in order for a definitive diagnosis to be reached.

What causes it?

Bacterial infection is the most common source of infective endocarditis (IE). However, it can also be caused by viruses, fungi, or other micro-organisms. Patients are at increased risk of IE if they: have congenital or acquired heart problems; have received cardiac surgery; have a permanent pacemaker; have poor dental hygiene; are an intravenous drug user; have a soft tissue infection; have received recent dental treatment; had an intravenous cannulae or central line inserted in hospital.

All patients who inject intravenously need to be made aware that using unsterile injecting equipment can result in serious life threatening conditions such as IE as well as blood borne viruses if equipment is shared. If patients do not use sterile injecting equipment then bacteria or fungi can be introduced into the blood stream. This results in the most common causal organisms colonizing bacteria such as Streptococcus and Staphylococcus. The infection migrates around the blood stream and often rests on the tricuspid valve. The infection forming on the valve of the heart is called a vegetation. The development of a vegetation is promoted by a damaged endocardium. When the vegetation adheres to the valve this often causes a heart murmur which is when the valves are no longer able to prevent blood regurgitating back into the right atrium as they have become 'floppy' which results in the right atrium not emptying completely which can be heard by listening to the heart. In some cases the vegetation can migrate to the lungs causing septic pulmonary infarcts which are capsules of infection/pus within the lungs. Other conditions which can develop are myocardial abscesses and septic emboli.

Can it be prevented?

For our patients many have acquired this condition through poor and unsterile injecting techniques and/or poor dental hygiene. However, an extensive assessment and history is required in order to identify the possible cause of this condition and provide the patient with health information and advice in order to prevent this condition reoccurring in the future.

Essential injecting practices for patients.

- Open a new sterile needle, syringe, and filter each time an intravenous substance is used. Filters must be from needle exchanges and not cotton wool as the fibres can enter the blood stream causing infection or possible deep vein thrombosis.
- Using hot water or using Sterets to clean injecting equipment does not eradicate bacteria and/or fungus from injecting equipment.
- Never use water out of the tap or bottle to prepare the substances without it being boiled first as it may harbour bacteria or fungus. Ensure the water is cool before using for injection.

- Advise the use of soap and water to clean the skin before injecting. If they use Sterets to prepare the injecting site, then this needs to be left to dry for 5 minutes in order to make the skin sterile. Patients are unlikely to wait this long therefore soap and water or wet wipes are more effective. Research has also shown that if the skin is punctured immediately after using a Steret the injection causes increased pain.
- Provide all patients with information leaflets such as 'A guide for injecting drug users' published by lifeline publications.
www.lifelinepublications.org.uk
- Never assume that if a patient has been injecting for a long time that they are aware of safer injecting practices.

Diagnosis and treatment

All patients who are suspected of having this condition in the community need to be assessed urgently in hospital. Diagnosis can be made by utilising the Duke criteria for the diagnosis of infective endocarditis (IE).

A diagnosis of IE can be made if two major criteria, one major and three minor or if five minor criteria are present (Duke Criteria).

Major criteria:

Positive blood culture for infective endocarditis

- Expected microorganisms for infective endocarditis from two separate blood cultures
- Persistently positive blood culture, defined as growth and identification of a micro-organism consistent with IE originating from blood cultures that are obtained more than 12 hours apart or three quarters or more separate blood cultures, with the first and last sample obtained at least 60 minutes apart.

Evidence of endocardial involvement supporting the diagnosis of IE

- Echocardiogram findings
 - a) oscillating intracardiac mass present on valve or supporting structures, or in the path of regurgitant blood flow, or on implanted material, in the absence of an alternative anatomical explanation
 - b) Abscess
 - c) Newly identified partial dehiscence of prosthetic valve
- New valvular regurgitation (increase or change in pre-existing murmur does not count as a criterion)

Minor Criteria

- Fever $\geq 38^{\circ}\text{C}$
- Predisposition to IE: heart condition predisposing to IE, or intravenous drug use
- Echocardiogram: findings may be consistent with IE, but major criteria as stated above not met.
- Immunological phenomena present: Roth spots, (superficial retinal haemorrhages- may be seen in other conditions), Osler's nodes (these are red tender nodules usually 5mm in diameter on pulps of fingers and toes), glomerulonephritis (impaired filtration of the kidneys resulting in protein and blood being lost in the urine), rheumatoid factor via laboratory analysis, and splinter haemorrhages – elongate under the nail bed.
- Microbiological evidence of IE: blood cultures are positive but major criteria are not met as previously described, or serological studies support an infection that is consistent with the diagnosis of IE.
- Vascular phenomena present: major arterial emboli, mycotic aneurysm, septic pulmonary infarcts, conjunctival haemorrhages, intracranial haemorrhage, janeway lesions which are red and painless areas under the palms and the soles.

Treatment is in the form of intravenous anti-biotics. However, it is imperative that blood cultures are taken before anti-biotic therapy is administered where possible in order to assist in the diagnosis.

Despite advances in antibiotic treatment and surgical care the mortality rate for acute infective endocarditis is estimated between 25 and 75 percent. The mortality rates remain high because of the difficulty in diagnosing infective endocarditis. Early symptoms are non-specific, and the disease is frequently fatal unless treated early. Therefore prompt recognition and treatment is paramount. •

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