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## CASE REPORT

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# Streptococcus Gallolyticus Endocarditis: A Case Report Contrasting the Response in Frail and in Strong Elderly Patients

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### ABSTRACT

The elderly are at increased risk of developing *Streptococcus gallolyticus* endocarditis. The infection is easily controlled by antibiotics but a valvular replacement may be needed for gross valvular dysfunction. Some patients may have associated colonic or hepatic lesions needing surgical intervention that increase morbidity, mortality and costs. We describe a 71-year-old patient with *Streptococcus gallolyticus* endocarditis and discuss the differences of response between the strong and the frail elderly.

*Keywords:* elderly, endocarditis, frailty, *Streptococcus gallolyticus*

### INTRODUCTION

It is becoming evident that the elderly are at increased risk of developing *Streptococcus gallolyticus* (*S. gallolyticus*) endocarditis<sup>1</sup>. Though the infection can easily be controlled by antibiotics, a substantial number of patients may still need valvular replacement. Some patients may have associated colonic or hepatic lesions needing surgical intervention that increases morbidity, mortality and costs<sup>2-5</sup>. However the clinical response of the elderly is not usually predictable: some develop considerable immunological response whereas the frail offer limited response, if any.

### CASE HISTORY

A 71-year-old Chinese lady, previously in good health, was admitted to hospital with a 3-week history of fever and low backache. She had taken a few courses of antibiotics prior to hospitalisation without much improvement. The fever was worse in the mornings and associated with chills and rigors. On further questioning, she admitted to have lost about 5kg in weight over the same time period and had also occasional loose stools. She had no previous history of dental procedures and she did

not take any intravenous medications or drugs. She had hyperlipidaemia and hypertension but both were well-controlled with medications.

On examination she was alert, non-toxic, and noted to have mild pallor of the conjunctiva. There were no jaundice, tattoo marks or lymphadenopathy. Her temperature was 38.3°C, pulse rate regular at 80 beats per minute, blood pressure 120/80mmHg, and respiratory rate 12 per minute. The jugular venous pressure (JVP) was normal but there was gross pitting oedema up to the mid shin. There was no tenderness over the sinuses and spines. There was no evidence of arthritis and there were no genital ulcers. There was no peripheral stigmata of infective endocarditis. The apex beat was not displaced. A faint diastolic murmur was heard in the left lower sternal border. The rest of the systemic examination was unremarkable. A tentative diagnosis of infective endocarditis was entertained and 3 blood samples were collected for culture and sensitivity prior to starting, intravenously, crystalline penicillin of 3 million units 4 hourly, and gentamicin 180mg once daily. The laboratory investigation showed a haemoglobin level of 9.7g/dL, serum iron of 5µmol/L, total iron-binding capacity of



Fig. 1. 2-D echocardiography of the heart showing large vegetations on the aortic valves.

26umol/L, transferrin saturation of 19%, white cell count of  $6.0 \times 10^9/L$ , platelet count of  $121 \times 10^9/L$ , sodium of 132mmol/L, potassium of 3.1mmol/L, and creatinine of 64umol/L. The serum albumin was 26g/L and the microscopic examination of the urine revealed 342 red blood cells per uL. The erythrocyte sedimentation rate was 40mm/h and CRP (C-reactive protein) was 65mg/L. The autoimmune screen was negative. The tumour markers were not elevated and the myeloma screen was negative. The chest radiograph was normal. CT (computer tomography) scan of the abdomen and pelvis did not reveal any abnormalities. The urine culture did not grow any organism. All 3 specimens of blood cultures grew *Streptococcus gallolyticus ssp gallolyticus*. The transthoracic echocardiogram revealed florid vegetations attached to the aortic valve with moderate aortic regurgitation (Fig. 1). The left ventricular systolic function was normal. The vegetations were confirmed by transoesophageal echocardiography. There were no abscesses in

the aortic ring or in the septum. Lumbar spine radiography showed spondylosis of the lumbar spine with degenerative narrowing of the L4/L5 disc space. There was no seeding on bone scanning.

A definitive diagnosis of *S gallolyticus* endocarditis was made. The patient underwent a colonoscopy which showed a polyp and was excised. Histological examination revealed an adenomatous lesion without evidence of malignancy. The patient improved on antibiotics and did not require surgery. On review 3 months later she was asymptomatic, without heart failure or clinical evidence of endocarditis. A repeated echocardiography revealed marked regression of the vegetations but the aortic regurgitation remained the same.

#### DISCUSSION

The occurrence of infective endocarditis associated with colonic carcinoma was first noted by McCoy *et al* and was reported in 1951<sup>4</sup>. Later in 1977, Klein *et al* related *S gallolyticus*, then known as *Streptococcus*

bovis, to colonic cancer<sup>6</sup>. Since then colonic lesions as well as extra-colonic lesions have been associated with *S. gallolyticus* bacteraemia and endocarditis. *S. gallolyticus* is a member of *Streptococcus bovis* complex that includes some strains previously classified as *Streptococcus bovis* biotype I and II/a and is a normal gut flora. The exact reason why it suddenly becomes invasive is not known, but it is thought that intestinal or liver pathology might decrease the intestinal motility thereby allowing its overgrowth. In the elderly, and in those with co-morbidities, it is postulated that a decrease in immunity might also be associated. It is also possible that colonic carcinogenic metabolites and chronic inflammatory mediators change the local conditions and disrupt the capillary channels allowing bacterial entry into the blood stream. The subsequent bacteraemia leads to seeding in the different parts of the body in particular the heart valves, the bones, and the vertebral discs. Intravenous drug abusers do not appear to be associated with *S. gallolyticus* endocarditis<sup>7</sup>.

*S. gallolyticus* endocarditis is different from other endocarditis because it is highly susceptible to intravenous antibiotics and is therefore considered "benign". Even then it infects valves of patients who are not known to have cardiac valvular abnormalities<sup>8-10</sup>. In our patient, a previously normal aortic valve was damaged by *S. gallolyticus* endocarditis and she mounted an adequate immunological response during the infection. The predilection of infection is the aortic valves, but the mitral as well as the tricuspid valves may also be affected, singly or in combination. The vegetations tend to be larger than those produced by other organisms and were noted in our patient. Patients with persistent bacteraemia and those with documented embolism or with resistant heart failure need to have a valvular replacement. Early valvular replacement may be needed in patient with massive vegetations and recurrent embolisms. Colonoscopy is indicated in the context of *S. gallolyticus* bacteraemia or endocarditis to look for colonic neoplastic changes. If the examination is normal, a repeat colonoscopy should be scheduled in 4 to 6 months, with regular surveillance subsequently. The patient should also be evaluated for liver disease and possibly extracolonic malignancy.

As the standard of living and standard of healthcare continue to rise worldwide, the elderly population is bound to increase, shifting the population pyramid to that of developed countries. This increased elderly population is faced with many degenerative, metabolic and infective disorders. Frailty, poor nutrition, associated co-morbidities, and the intake of immunosuppressants, all appear to affect some elderly patients and make them respond differently from others with intact immunity. The result is that elderly patients, even in the face of life-threatening infection, may not have fever or mount a leucocytic response. They may just present with vague symptoms such as lethargy and weakness or alteration of mental state. In the literature there is ample evidence of this happening in elderly patients with occult or overt infections. In the absence of fever and heart murmur, a diagnosis of infective endocarditis is usually not entertained. Therefore a further delay of 3 to 4 days occurs when finally the blood cultures reveal bacteraemia and echocardiography confirms the presence of vegetations on the heart valves. This explains the tendency of early treatment of elderly patients who present with only vague symptoms with wide-spectrum antibiotics, while awaiting blood and urine culture and sensitivity results. This practice has saved many elderly patients. The presence of *S. gallolyticus* should warrant a search for underlying carcinoma of the colon primarily, but also malignancies of the liver and the gastrointestinal tract. However, these same frail elderly patients may not be suitable candidates for invasive investigations such as colonoscopies, or they may not be able to afford other costly investigations. The ethical challenge arising from such situations are obvious. Furthermore, there is the inevitable increase in incidence of multi-resistant bacteria in health institutions and in the community as the use of antibiotics become more widespread.

There are a number of elderly patients who mount a normal immunological response in the face of infections. The case history described above is a typical example. The reasons why some elderly patients are "stronger" than others still elude us. No doubt heredity does play a significant part in it as well as lifestyle, but the psychological component, particularly the will to live, must have a significant contribution. It is known that elderly patients who take cheese containing

some specific probiotics have enhanced immunity<sup>11</sup>. Associated co-morbidities, particularly diabetes mellitus, chronic liver disease and rheumatic disorders, are known to decrease the immune system. The intake of trace elements and vitamin supplements seem to help in the fight against infective organisms<sup>12</sup>. It is not known to what extent exercise helps to boost immunity; however it has been shown in rats that exercise does indeed improve immunity<sup>13</sup>. Decreased protein intake in the elderly is due to poor appetite, unbalanced diet, poor nutrition or socio-economic reasons, and leads to decreased production of immunoglobulins needed to combat infections. Genetic studies might point to the different genotypic variations that might explain why these elderly patients have the capacity to mount a full blown immunological response to infections. Further research on immunity will probably help in finding ways and means by which immunomodulation might help the elderly in the prevention of infections<sup>14</sup>. In developing a preventive strategy to preserve or increase the immunity of the elderly all the above points will need to be taken into consideration.

## CONCLUSION

Elderly patients respond differently to the stress of *S. gallolyticus* infections. Some mount a significant immunological response whereas others offer very little, if any. Even though the vegetations on heart valves are large, the infection responds quickly to intravenous antibiotics. Patients with persistent heart failure and recurrent embolism should be offered a valvular replacement. The presence of a colonic or extra-colonic neoplasm should be actively pursued even if initial investigations are negative. However frailty and co-morbidities may preclude invasive investigations and operative management. To help decrease health costs, preventive strategies to decrease frailty in an increasing elderly age group may need to be elaborated.

## TAKE HOME MESSAGE

The elderly patients are in fact a heterogenous group. Their response to infections can be varied and challenging for physicians. Some of them have a good response to infections while others may have blunted or absent response leading to delayed

diagnosis and treatment. Thus, it is important to be cognizant of both typical and atypical presentations in the sick elderly.

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