

INFECTIVE ENDOCARDITIS AMONGST INTRAVENOUS DRUG ABUSERS SEEN AT THE UNIVERSITY HOSPITAL, KUALA LUMPUR

* R. JAYAMALAR MBBS, MRCP.

**N. PARASAKTHI MBBS, MSc.

**S.D. PUTHUCHEARY MBBS, MHPEd, MRCPATH.

Departments of Medicine* and Medical Microbiology**
University Hospital, University of Malaya
59100, Kuala Lumpur, Malaysia.

SUMMARY

Drug abuse is a major problem in Malaysia. Serious complications of intravenous drug addiction include septicaemia and infective endocarditis. We present nine cases of endocarditis occurring amongst drug abusers. The tricuspid valve was most frequently involved and the common aetiological organisms were *S. aureus* and *Str. faecalis*. There was a high mortality rate of 67% in our study, in spite of appropriate therapy. Early recognition of the disease and aggressive treatment is required to improve the associated mortality.

INTRODUCTION

Drug addiction is a major social and economic problem in Malaysia, but there have been no reports locally on the health risks of drug abusers. Although a spectrum of diseases is seen amongst them, reports from Sweden¹ and North America^{2,3,4} suggest that septicaemia and endocarditis are the most serious complications of drug addiction.

This is a report on the pattern of infective endocarditis amongst drug abusers seen at the University Hospital, Kuala Lumpur in terms of clinical presentation, causative agents management and outcome.

PATIENTS AND METHODS

The hospital records of all intravenous drug abusers with infective endocarditis admitted to the University Hospital from 1982 to 1986 were reviewed. The final study consisted of nine such patients. Criteria for definitive diagnosis of infective endocarditis included: (a) at least two positive blood cultures in patients with a regurgitant cardiac murmur, or (b) at least two positive blood cultures in patients with cardiac auscultatory findings consistent with tricuspid valve endocarditis and shown by echocardiogram to have vegetations on the valve.

All patients had routine blood and urinalysis, electrocardiograms and chest X-rays. Echocardiograms were performed on all except two patients. At least two blood cultures were taken prior to institution of empirical drug therapy. Blood cultures were inoculated into Robertson's cooked meat medium and liquid broths. These were incubated at 37°C and processed by routine methods. All positive isolates were identified by standard bacteriological procedures. Antibiotic sensitivity tests were performed by the comparative disc diffusion method.⁵

RESULTS

Nine patients fulfilled the diagnostic criteria of infective endocarditis; two patients fulfilled criteria (a) and five criteria (b). Two additional patients were suspected to have tricuspid valve endocarditis on the basis of two positive blood cultures and cardiac auscultatory findings consistent with tricuspid incompetence but both succumbed before an echocardiogram could be performed.

All nine patients were males with ages ranging from 19 – 49 years (mean 30.1 years); eight of them being Malays and one an Indian.

The clinical and bacteriological profiles of the nine patients are summarised in Table 1.

Clinical presentation: The common presenting symptoms included fever (nine patients), cough, mainly dry with scanty mucoid sputum (six patients), pleuritic chest pain (two patients) and dyspnoea (two patients). The duration of symptoms varied from less than one week (five patients) to more than one month (three patients).

Five patients had evidence of vasculitis – the commonest presentation of which was subconjunctival haemorrhages. Splenomegaly was present in two patients. Six patients had anaemia (Hb < 11 gm%) and eight had polymorphonuclear leucocytosis (TWC > 10,000/ul). Renal impairment was present in five patients at admission but only two had microscopic haematuria.

All nine patients had significant cardiac murmurs on auscultation but were not known to have heart disease prior to admission. Of the seven patients who had echocardiograms, the tricuspid valve was most frequently involved (five patients) followed by the mitral valve (three patients) and the aortic valve (one patient). Two patients had vegetations on both the mitral and tricuspid valves simultaneously. Six patients had clinical and radiological evidence of multiple septic pulmonary emboli and all had evidence of tricuspid valve endocarditis. The radiological features consisted of multiple pulmonary infiltrates with and without cavitation.

Bacteriological results: *Staphylococcus aureus* was isolated as the sole pathogen in five patients, *Streptococcus faecalis* from two and from one patient *Mycobacterium fortuitum* was isolated but was identified only after he died (case 7). Mixed infection with *S. aureus* and *Str. faecalis* was present in one patient.

Four of the six isolates of *S. aureus* were sensitive to penicillin and all were sensitive to methicillin.

Management: All patients were medically managed with antibiotics. One patient, however, required mitral valve replacement because of refractory pulmonary oedema and cardiogenic shock resulting from chordal rupture which occurred on the 25th day of antibiotic treatment. Cloxacillin, benzyl penicillin and gentamicin were used in all except two cases.

Outcome: Six of the nine patients died during therapy giving a high mortality rate of 67%. Three patients died within 72 hours of admission and three others between 13 to 21 days after admission. The causes of death included respiratory failure (two patients), acute pulmonary oedema secondary to rupture of the mitral valve apparatus (three patients), multiple cerebral emboli (one patient) and gastrointestinal haemorrhage (one patient). Three patients are alive and well, the longest follow up being two and a half years.

Table 1. Clinical profile of intravenous drug addicts with infective endocarditis.

| No. | Age (yrs) | Symptoms | Duration in weeks | Organisms involved | Pulmonary involvement | Heart valve involved | Antibiotic therapy (Duration in wks) | Outcome |
|-----|-----------|---------------------------------|-------------------|---|-----------------------|----------------------|---|-----------------------------------|
| 1. | 28 | fever, cough, pleuritic pain | <1 | <i>S. aureus</i> | present | tricuspid | cloxacillin penicillin gentamicin | died 3 days after admission |
| 2. | 22 | fever, cough | <1 | <i>s. aureus</i> | present | tricuspid, mitral | cloxacillin penicillin gentamicin | died 13 days after admission |
| 3. | 31 | fever, cough | >4 | <i>S. aureus</i> | absent | tricuspid, mitral | cloxacillin penicillin gentamicin (3) | died 3 weeks after admission |
| 4. | 22 | fever, ankle oedema | >4 | <i>S. aureus</i> | absent | mitral | penicillin cloxacillin gentamicin ↓ ampicillin (9) | mitral valve replaced well |
| 5. | 22 | fever, cough, pleuritic pain | <1 | <i>Str. faecalis</i> | present | tricuspid | ampicillin cloxacillin gentamicin (6) | well |
| 6. | 19 | fever, cough | 3 | <i>S. aureus</i> | present | tricuspid | cloxacillin penicillin gentamicin (6) | well |
| 7. | 18 | fever, generalised weakness | >4 | <i>M. fortuitum</i> | absent | aortic | penicillin gentamicin | died 16 days after admission |
| 8. | 30 | fever, abdominal pain, dyspnoea | <1 | <i>S. aureus</i> & <i>Str. faecalis</i> | present | tricuspid | cloxacillin gentamicin | died within 24 hours of admission |
| 9. | 49 | fever, cough, dyspnoea | <1 | <i>S. aureus</i> | present | tricuspid | cloxacillin penicillin gentamicin | died within 24 hours of admission |

DISCUSSION

The age and sex distribution of our cases are in accordance with most published series which show a preponderance among young males.^{2,7}

Sixty seven percent of our patients had tricuspid valve endocarditis either alone or in combination with other valves. The predominance of tricuspid valve involvement in our small series appears similar to that

of published reports.^{6,7} However, other workers^{8,9,2} have reported a higher frequency of left-sided valvular involvement amongst drug addicts with infective endocarditis.

The recognition of tricuspid valve endocarditis clinically is sometimes difficult, especially in the early stages when characteristic murmurs may be absent. Echocardiography has greatly facilitated the diagnosis of tricuspid valve endocarditis, although it is not always sensitive. Five of our patients with tricuspid valve involvement were diagnosed clinically.

The patients with tricuspid valve involvement had in addition septic pulmonary emboli. Whilst characteristic radiological features were present in six of our patients, initial x-ray findings may be atypical and often patients are misdiagnosed as having bronchopneumonia. Julander *et al*¹⁰ has proposed that the presence of staphylococcal septicaemia, septic pulmonary emboli and narcotic addiction be considered a diagnostic triad for tricuspid valve endocarditis in the absence of another source for the septic pulmonary emboli such as septic thrombophlebitis. None of our patients were anticoagulated because of the risk of pulmonary haemorrhages.

The common organisms cultured from our patients were *S. aureus* and *Str. faecalis* as in other studies.^{7,2} *M. fortuitum* has not been commonly reported in infections amongst drug addicts but was the significant pathogen in one of our cases. None of our patients had documented yeast or fungal endocarditis. Whilst four of the six isolates of *S. aureus* were sensitive to penicillin, others have reported a high percentage of penicillin resistance amongst *S. aureus* isolates.^{7,1}

The mortality rate in our series was very high, mainly because the patients were often admitted with fulminant disease. Three of the patients had disruption of the infected mitral valve apparatus resulting in pulmonary oedema. One patient needed surgical intervention and although early perioperative mortality in these patients appear low, Hubbell *et al*² have shown that their late mortality is often high due to paravalvular leaks and problems due to prosthetic valves in intravenous drug abusers.

In order to reduce the mortality associated with infective endocarditis amongst drug addicts, an organised diagnostic approach and aggressive implementation of appropriate antimicrobial therapy is required. A high index of suspicion is necessary as early recognition of tricuspid valve endocarditis clinically is sometimes difficult. Appropriate empirical antibiotic therapy should, in view of our bacteriological findings, include penicillin, cloxacillin and an aminoglycoside.

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