PRACTICE OBSERVED

*Papers That Have Changed My Practice***Managing patients with endocarditis and Down's syndrome**

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Forward, forward let us range.
Let the great world spin forever
down the ringing grooves of change.

TENNYSON

With the words of *Locksley Hall* inspiring me I sat down to consider the changes that have occurred over the past 10 years in the way I practise. Certainly there have been changes, but most of them have come about gradually and have a multifactorial aetiology—discussion with hospital and practice colleagues, review articles in journals, lectures or postgraduate courses, and experiences in practice. A certain direction and predictability may be detected in these changes which make Tennyson's exhortation all the more apposite. Occasionally, however, a single scientific paper may be a catalyst for change. I have selected two such papers, one on therapeutics and one on screening.

Patients with endocarditis

Three of my patients have prosthetic heart valves, several more have rheumatic heart disease, and over a dozen have congenital heart lesions. Our practice is entirely rural, and the nearest dentists are in the adjacent market towns of Daventry, Banbury, and Southam. Those patients at risk of endocarditis have been made aware of the dangers of dental treatment and are asked to consult us before undergoing dental extractions, scaling, or surgery to the gingival tissues.

It was my practice to give a parenteral antibiotic approximately 30 minutes before any of the above procedures. As most dentists' surgeries are at least 10 miles from our medical centre this required careful liaison among our receptionist, the dentist's receptionist, and the patient. It also meant that either our practice nurse or one of the doctors had to be available at different times throughout the day, and on Saturday mornings, to give the injections.

The regimen used to be as follows: (i) benethamine penicillin, procaine penicillin, and benzylpenicillin (Triplopen) one vial intramuscularly and (ii) streptomycin sulphate 1 g intramuscularly, both given 30 minutes before the dental procedure, which was followed by phenoxymethylpenicillin 250 mg four times a day for four days.

For individuals who were allergic to penicillin the following regimen was used: (i) streptomycin sulphate 1 g intramuscularly given 30 minutes before the procedure and (ii) erythromycin stearate 1 g orally given one to two hours before the procedure, followed by erythromycin stearate 500 mg four times a day for four days.

These recommendations were based on advice given in 1977 by one of the dental surgeons at the local district general hospital. As well as causing considerable administrative inconvenience to us the regimen was not popular with patients; it meant a visit to the surgery, one or two injections (Triplopen being particularly painful for many), and then a 10 to 15 mile dash to the dentist, followed by having to take tablets regularly for the next four days.

I was therefore encouraged to read a paper in the *BMJ* in February 1980 on "High dose oral amoxycillin for preventing endocarditis."¹ The authors had previously reported that a single 2 g oral dose of amoxycillin gave higher and more sustained serum concentrations than an equivalent dose of phenoxymethylpenicillin, but that this dose of amoxycillin given one hour before a dental procedure still failed to achieve adequate serum bactericidal concentrations for the critical nine hour period after dental bacteraemia.²

In this paper the serum amoxycillin concentrations were measured after single oral doses of 3 g and 4 g of the drug in 13 healthy men volunteers and side effects were noted. The results showed that serum amoxycillin concentrations after the 3 g oral dose were well above the minimum bactericidal concentrations of amoxycillin for viridans streptococci for at least 10 hours. The 4 g dose gave slightly higher serum concentrations but was associated with more side effects. The authors concluded that high dose oral amoxycillin "provides a highly satisfactory oral prophylaxis for endocarditis." They recommended that a single 3 g dose should be given under supervision one hour before the

dental procedure. A second dose was probably unnecessary, but for the present they advised a safer approach, recommending that a second 3 g dose should be taken eight to nine hours after the procedure. They concluded by advising that this oral regimen should normally be given only outside hospital and was contraindicated in patients receiving general anaesthesia; patients with prosthetic heart valves should continue to receive parenteral prophylaxis.

After discussions with some of our local dentists (who had also been encouraged by this paper) we abandoned our previous regimen and issued patients at risk with two 3 g sachets of amoxycillin. They were instructed to take one sachet one hour before attending the dentist and the second sachet eight hours after the procedure. To allow more flexibility in their getting to the dentist we decided not to supervise our patients' taking of the first sachet of amoxycillin but written instructions emphasising the importance of the timing were issued with the prescriptions.

This change was welcomed by those patients who had had experience of our former regimen; it avoided injections, gave them more time to get to the dentist after having their prophylaxis, and greatly simplified their follow up dosage. It also meant less administrative inconvenience for us and our nursing and reception staff.

We have further amended our procedure since the publication in 1982 of a report of a working party of the British Society for Antimicrobial Chemotherapy on the antibiotic prophylaxis of infective endocarditis.³ This recommended a single 3 g oral dose of amoxycillin one hour before the dental procedure and no follow up dose. For patients allergic to penicillin it recommended 1.5 g erythromycin stearate by mouth one to two hours before the dental procedure, followed by a second dose of 0.5 g six hours later. The report also stated that there was no evidence that patients with prosthetic valves were at more risk of acquiring an infection after a dental procedure than patients with damaged natural valves. It therefore recommended the same prophylactic regimen for patients with prosthetic valves as for other susceptible patients. We have implemented these changes, and this even simpler regimen seems to be working to the satisfaction of patients, dentists, and doctors.

Patients with Down's syndrome

In 1978 I read an article on Down's syndrome by Campbell Murdoch.⁴ In it he referred to a paper on a survey of thyroid function in adults with Down's syndrome published one year before,⁵ which described the assessment of the thyroid status of 82 institutionalised adults with Down's syndrome. Compared with age and sex matched controls these patients had appreciably lower mean total serum thyroxine (T4) and triiodothyronine (T3) concentrations, lower free thyroxine index, and higher basal serum thyrotrophin (TSH) concentrations. Abnormalities in one or more tests of thyroid function were shown in at least 38 (46%) of the 82 patients; 13 (16%) were found to have primary hypothyroidism and 11 (13.4%) had positive thyroid antibodies. Seven (54%) of the hypothyroid patients had positive thyroid antibodies. The authors concluded that "thyroid dysfunction, in particular hypothyroidism, is common in adults with Down's syndrome, though specific tests are usually required to make the diagnosis."

These findings were confirmed by several other studies on groups of patients with Down's syndrome over the next few years. Sare *et al* found a 17% prevalence of hypothyroidism in 121 adults⁶; Korsager *et al* discovered that 13% of their 24 adult patients were hypothyroid⁷; Lobo *et al* ascertained that 7% of 101 children aged over 5 years and adults were myxoedematous.⁸

In 1980 Murdoch reported that all of his original patients who had thyroid antibodies but were euthyroid displayed evidence of biochemical hypothyroidism and deterioration of thyroid function over a two year follow up period.⁹ He emphasised the difficulty of clinically diagnosing myxoedema in patients with Down's syndrome, saying that "it ought now to be estab-

lished practice that all patients with Down's syndrome have biochemical tests of thyroid function carried out regularly, and that those with thyroid antibodies should be considered at particular risk of developing hypothyroidism."

My partners and I look after 19 adults with Down's syndrome, who are residents of Solden Hill House, a home near Byfield in Northamptonshire run on Rudolf Steiner principles. Before reading the paper by Murdoch *et al* my practice was to treat the residents as "normal" patients, seeing them when possible during ordinary surgery consulting sessions. Consequently, they were seen only when thought to be ill by one of the members of staff. No form of anticipatory care was practised. In 1978, partly as a result of reading Murdoch's paper and partly because many of the residents were in their late 30s and early 40s (relatively old for people with Down's syndrome), we decided to introduce an annual medical examination. So far no important medical problems have been detected as a result of these examinations. In particular, none of the residents showed any clinical evidence of thyroid dysfunction.

In 1979, having reread the paper by Murdoch *et al* I suggested that we check T4, T3, and TSH and thyroid antibodies on all the residents. I discovered that of the 19 patients, three were biochemically hypothyroid and one was hyperthyroid; six had thyroid antibodies. The overall prevalences of thyroid dysfunction (21%) and in particular hypothyroidism (16.5%) were in keeping with those previously described,⁵⁻⁸ as was the prevalence of thyroid antibodies (32%).

Treatment was started to correct these thyroid dysfunctions, and clinical improvement occurred in all four residents. At the same time a controlled trial was begun to study the effects of thyroid replacement treatment on the psychological performance of the hypothyroid individuals, particularly in the areas of concentration, ability to learn new material, and motor speed (McAvoy and McDowell in press).

I now check thyroid function annually on all the residents of Solden Hill House, the tests currently in use being free serum T4 and serum TSH. All new residents are examined for evidence of hypothyroidism, and have thyroid function tests checked, including thyroid antibodies. Particular attention is being paid to the thyroid status of the four individuals who are known to have thyroid antibodies but are euthyroid; so far they have not yet become hypothyroid.

The physical improvement in the four residents with thyroid dysfunction has been most gratifying. When the oldest hypothyroid subject, aged 46, and the most senior resident at Solden Hill House went home for his first summer holiday after starting treatment his mother wrote the principal an unsolicited letter reporting how much "younger, livelier, and more sprightly" he appeared!

Changes occur for many reasons but I believe that the events described above resulted from reading two scientific papers, and enabled my practice world to "spin . . . down the ringing grooves of change."

References

- Shanson DC, Ashford RFU, Singh J. High dose oral amoxycillin for preventing endocarditis. *Br Med J* 1980;280:446.
- Shanson DC, Cannon P, Wilks M. Amoxycillin compared with penicillin V for the prophylaxis of dental bacteraemia. *J Antimicrob Chemother* 1978;4:431-6.
- Working Party of the British Society for Antimicrobial Chemotherapy. The antibiotic prophylaxis of infective endocarditis. *Lancet* 1982;ii:1323-6.
- Murdoch JC. Down's syndrome, part 2. *Update* 1978;17:1374-9.
- Murdoch JC, Ratcliffe WA, McLarty DG, Rodger JC, Ratcliffe JG. Thyroid function in adults with Down's syndrome. *J Clin Endocrinol Metab* 1977;44:453-8.
- Sare Z, Ruvalcaba RHA, Kelley VC. Prevalence of thyroid disorder in Down's syndrome. *Clin Genet* 1978;14:154-8.
- Korsager S, Chatham EM, Østergaard Kristensen HP. Thyroid function tests in adults with Down's syndrome. *Acta Endocrinol* 1978;88:48-54.
- Lobo E de H, Khan M, Tew J. Community study of hypothyroidism in Down's syndrome. *Br Med J* 1980;280:1253.
- Murdoch JC. Hypothyroidism in Down's syndrome (letter). *Br Med J* 1980;281:149.