Joint replacement, dental surgery, and antibiotic prophylaxis

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Numerous case reports support the assertion that secondary infection around prosthetic joints can occur after dental disease or manipulation, or both, but the need for prophylactic antibiotics remains controversial. In the United States prophylaxis is recommended, whereas in Britain individuals adopt their own policy. We surveyed orthopaedic surgeons and dental and general practitioners to determine their attitude towards prophylaxis in patients with prosthetic joints undergoing dental treatment.

Subjects, methods, and results

We sent a postal questionnaire to 125 each of orthopaedic surgeons, dentists, and general practitioners. Orthopaedic surgeons were asked whether any of their arthroplasty patients had had infections secondary to dental disease, about preoperative dental assessment, and whether they recommended prophylactic antibiotics for subsequent dental treatment. The dentists were asked about the need for prophylaxis in patients with prosthetic joints and those with cardiac lesions. General practitioners were asked about their prescribing habits in patients with prosthetic joints who had dental disease and about advice received from local orthopaedic surgeons. The table shows the response rates.

Response rate to survey about antibiotic prophylaxis for patients with prosthetic joints undergoing dental treatment

	No sent surveys	No (%) who returned surveys
Orthopaedic surgeons	125	104 (83)
General practitioners	125	98 (78)
Dental practitioners	125	101 (81)

Ten of 104 orthopaedic surgeons reported infections thought to be secondary to dental disease, and two had isolated appropriate bacteria from infected joints. Four requested preoperative dental assessments, and 54 advised patients to request antibiotic prophylaxis during subsequent dental treatment. Only 33 gave similar advice to the general practitioner.

Only four of the 98 general practitioners were advised to give antibiotic prophylaxis to patients with prosthetic joints. Eighteen gave antibiotics to patients with subsequent dental infection.

Ninety one of the 101 dental surgeons gave prophylaxis to patients with cardiac lesions but only 25 gave it to those with prosthetic joints. Dentists agreed that in appropriate patients prophylaxis was needed for all procedures causing gingival trauma and bleeding.

Comment

A causal relation between transient bacteraemia of dental origin and infection about a prosthetic joint has not been proved,¹ although a growing number of reports implicate dental disease in late sepsis.² A report showing a temporal relation between dental treatment and infection and in which peptostreptococcus was isolated from the joint is particularly pertinent.³

In our survey 10% of participating surgeons believed that one or more of their patients had had late sepsis of dental origin. This is a surprisingly large report of sepsis from a potentially treatable source.

In a survey of American orthopaedic surgeons 93% (1488 of 1600) recommended antibiotic prophylaxis.¹ Only 52% of our surgeons recommended that their patients ask for antibiotic prophylaxis for dental treatment and 32% advised general practitioners that these patients should receive prophylaxis. Only four (3%) general practitioners reported receiving such advice.

There is wide agreement that antibiotic prophylaxis for dental treatment is necessary in high risk groups of patients with prosthetic joints.⁴ These groups include patients with diabetes mellitus, rheumatoid disease, and revised joints, and those who are immunosuppressed or taking steroids. Issuing patients with a joint replacement card may encourage dentists and general practitioners to prescribe prophylaxis.

The choice of antibiotic is important. Review of the bacteriology of infected prosthetic joints supports the use of broad spectrum drugs such as cephalosporins or penicillins with β lactamase resistance.⁵

We recommend a preoperative dental check up before arthroplasty and that antibiotic prophylaxis should be given to patients receiving dental treatment causing gingival trauma or significant bacteraemia. Greater effort should be made by orthopaedic surgeons to inform general and dental practitioners of the need for antibiotic prophylaxis in patients with prosthetic joints receiving dental treatment.

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Antitoxins and botulinum toxin treatment

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Injecting *Clostridium botulinum* type A toxin is now an established treatment for focal dystonia,^{1,2} but it is not a cure. Motor endplate regeneration generally leads to the re-establishment of symptoms; treatment is usually repeated at intervals of two to three months. Most patients respond well to chronic treatment, and there is good evidence that efficacy is maintained,³ but a

minority of these patients stop responding^{3,4} for reasons that are not entirely clear. Antibody formation may be the cause in some patients.⁵ We report the results of a survey of serum samples from patients with torticollis who had had extended courses of treatment with toxin. Generally, such patients receive the highest doses of toxin and might be considered to be most likely to develop toxin neutralising antibodies.

Patients, methods, and results

From several hundred patients treated for spasmodic torticollis for some years with botulinum type A toxin, 10 who had maintained their response to treatment and 10 whose response had diminished appreciably were

Patient No and sex	Duration of symptoms (years)	Duration of treatment (months)	No of injections	Total dosage (ng)	Titre of antitoxin against mouse median lethal dose
Diminished responses:					
33 M	8	39	6	63	NA
34 F	5	36	13	245	>60
40 F	8	34	9	174	>60
45 F	3	13	4	71	NA
47 F	3	37	13	312	NA
52 F	19	35	16	395	>60
54 F	6	46	11	229	>60
61 F	1	11	12	345	NA
65 F	16	31	13	233	>20 <60
67 F	0-3	8	6	103	>60
Mean	6.9	29.0	10.3	2.17	
Range	0.3-19	8-46	4-16	63-395	
Continued responses:					
32 F	6	24	8	112	NA
37 M	16	28	7	124	NA
39 F	24	18	6	109	NA
44 M	9	32	14	229	NA
46 M	13	35	13	385	>6 <20
51 M	9	30	11	582	NA
57 M	1	26	10	200	NA
60 M	12	27	11	275	NA
64 F	21	32	11	210	NA
66 F	4	20	9	170	NA
Mean	11.5	27.2	10.0	239.6	
Range	1-24	18-35	6-14	109-582	
Positive controls: (n=10)					All >60
Negative controls: (n=10)					All NA

NA=No evidence of antitoxin formation.

selected. Both groups were selected on the basis of prolonged treatment, and the groups were well matched (table). The selection criterion for the diminished response group was a significant diminution in response to several injections or a need to increase the dose above that normally required to achieve an adequate response. Positive antibody controls were obtained from staff of the Centre for Applied Microbiology and Research immunised with botulinum toxoid (types ABCDE) vaccine and negative controls from unvaccinated staff who had never been treated with toxin.

Serum samples were assessed by an *in vivo* toxin neutralisation test in which portions (1.5 ml) of each serum sample were mixed with an equal volume of diluted reference toxin solutions (containing 0.2, 0.6, 2, 6, 20, and 60 times the mouse median lethal dose) and incubated at 30°C for one hour. Portions (0.5 ml) of each mixture were injected intraperitoneally into four MF1 strain mice per patient; animals were observed for four days and deaths recorded. The presence of mice surviving beyond four days in groups receiving >6 times the mouse median lethal dose was taken as evidence of the presence in serum samples of toxin neutralising antibodies. Results were expressed as the number of mouse median lethal doses neutralised by 1 ml of serum.

Of the samples from torticollis patients having a maintained response to toxin treatment only one showed evidence of formation of low concentrations of antitoxin (table). This patient was subsequently found to have developed a noticeable reduction in the duration of beneficial response to toxin and had a need for higher doses than normally given.

In the diminished response group, six patients showed toxin neutralising concentrations of >60 median lethal doses neutralised and one >20<60 median lethal doses neutralised. Of the three patients who showed no ability to neutralise toxin, two had shown beneficial response to only one treatment; it is not clear from their clinical records whether they could be categorised as significantly diminished responders or non-responders. The third patient subsequently showed a reasonable clinical response to further injections.

Comment

The results clearly show that chronic therapeutic regimens may, in a very small proportion of patients, induce the formation of toxin neutralising antibodies that considerably diminish or abolish the beneficial effects of toxin treatment. It is not possible, however, to predict a dosage or duration of treatment that would give rise to the formation of detectable antibody.

Where treatment with toxin induces the formation of neutralising antibody the prospect for continued benefit accruing from the treatment is minimal. Such patients might hope for further benefit from the use of botulinum toxins of other serotypes, since the various serotypes do not generally cross react. The clinical efficacy of other toxin types has, however, yet to be shown.

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ONE HUNDRED YEARS AGO

THE ART OF PLAYING

Gymnastics flourish in Germany, but games seem to be almost unknown in many schools of the Fatherland. Last year, at the instance of Herr von Schenckendorff, a member of the Prussian Landtag, a meeting of gentlemen from all parts of Germany was held in Berlin to consider how games for children and young people could be made popular throughout the Empire. As a result of this meeting a Central Committee was formed to take steps to bring the matter before the German public. A book, entitled *Jugend und Volkspiele*, has been issued under the auspices of the committee, in which the whole subject is treated "theoretically, historically, and practically," with the exhaustiveness which is the "note" of German writings, even on the lightest themes. The work consists

of a number of articles, each from the pen of a competent authority, somewhat on the lines (*si parva licet componere magnis*) of our great modern *Boke of Sportes*, the Badminton Library. Not content with this, the Central Committee proposes to teach the rising generation of Germany the apparently lost art of playing; and in the course of the present year courses of instruction in school games for teachers are to be given at Berlin, Bonn, Brunswick, Hanover, and G6rlitz. The idea of teaching games may to Englishmen appear somewhat grotesque, but M. Fernand Lagrange, in his book on *Exercise in Childhood*, states that only a few years ago a similar movement was set on foot and carried to a highly successful issue in Belgium, where even the tradition of games had been lost in the schools, and a similar association in France, recently founded, claims to have achieved considerable results. (*BMJ* 1892;ii:515)