

Successful defibrillation of a dental patient in cardiac arrest

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Abstract

Cardiac arrest is a very rare event in a dental patient. However, practitioners have a duty of care to their patients if ever such an event occurs. The cardiac arrest discussed in this case report occurred in an elderly person with an implanted pacemaker whilst undergoing restorative dental treatment. Cardiac arrest was diagnosed and cardiopulmonary resuscitation instituted immediately, followed within three minutes by successful defibrillation using the School's semi-automatic defibrillator.

Key words: Cardiac arrest, successful defibrillation.

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INTRODUCTION

It is becoming increasingly obvious that dental practitioners are legally expected to be able to perform basic life support (BLS) measures, i.e., expired air resuscitation (EAR) and cardiopulmonary resuscitation (CPR) for a patient whilst in their care.^{1,2,3} The overwhelming majority (96-99 per cent)^{1,2} of Australian dentists also agree with this philosophy. Thus, if a patient suffers cardiac arrest, practitioners should be able to initiate skilled and appropriate BLS measures. Resuscitation skills should be maintained by regular re-familiarization courses, preferably annually.¹

Trends in this regard in the United States of America are of interest, as increasingly more States require proof of CPR competence for initial registration and continuing registration. In 1995, 18 State Dental Boards in the United States required certification in CPR for initial registration as a dentist, while 22 (just less than half) required that proof of recertification in CPR be provided for renewal of registration, most commonly on an annual or biennial basis.³

A recent study of 811 Australian dentists showed that about one in seven had experienced a resuscitation emergency.¹ Also 55 per cent felt they were competent in BLS on graduation, while 64 per cent had undertaken further resuscitation training on at least one occasion since graduation (most within the previous

five years) but only 16 per cent believed that annual refresher courses are necessary in order to maintain skills.¹ CPR skills deteriorate rapidly after 12 months and inadequate CPR technique will directly affect the outcome. Also, it is well known that a person's perception of their own BLS skills is frequently over-rated compared to their actual competence.⁴ Finally, it is more likely that a practitioner will need to use his/her CPR skills away from the surgery, e.g., at home, than in the surgery.¹

Probably the first case of an appropriately trained dental practitioner using a defibrillator was reported in 1991 by Hunter.⁵ Cardiopulmonary resuscitation was instituted immediately and the first counter shock (200 joules) was delivered in about three minutes, without effect, but was then repeated with success. The patient made a good recovery and was discharged from hospital 10 days later.

CASE REPORT

A 73-year-old male patient attended for continuing restorative treatment on a lower tooth with a final year dental student at 8.30am. He had suffered an acute myocardial infarction (AMI) two years previously and because of subsequent ventricular dysrhythmias had then been fitted with an implanted bipolar pacemaker and had suffered no cardiac problems since. He was also a non-insulin dependant diabetic which was well controlled. His medical practitioner had been advised of the proposed dental treatment plan.

The student later reported that he was calm, appeared well and seemed relaxed as he was brought into the clinic. A local anaesthetic (prilocaine with felypressin, 2.2ml) was given for an inferior dental block at about 8.40am. The patient reported the injection had caused only little discomfort and onset of anaesthesia soon occurred. Cavity preparation was then started and the patient reported he felt no pain in the tooth. At about 8.55am the patient's mouth suddenly started to close and the student noticed simultaneous onset of laboured breathing and then loss of consciousness. Cardiac arrest was then diagnosed, an emergency declared, and CPR immediately commenced with the patient in the dental chair, using a pocket mask initially then a manual resuscitator with supplemental oxygen. Within two minutes the School's

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semi-automatic defibrillator had been brought to the chair and the defibrillation pads placed – the rhythm was identified as ventricular fibrillation and one shock (200 joules) was delivered which resulted in immediate return of spontaneous pulse and ventilation – this occurred within three minutes of the collapse. The patient began showing signs of awareness and responded to questions by nodding or shaking his head. An ambulance arrived within a couple of minutes.

The patient was transported to hospital where it was confirmed he had suffered cardiac arrest subsequent to an AMI but suffered a further AMI three weeks later while still in hospital which unfortunately proved fatal. This is the only instance that the defibrillator has been used since it was obtained in 1990.

DISCUSSION

Modern pacemakers are bipolar and have improved interference-resistant circuitry and the risk of electromagnetic interference is therefore very small compared to the earlier monopolar type.⁶ That is, normal dental treatment is considered safe – however, it is advisable not to use any ancillary equipment which may create an EM field, e.g., diathermy, ultrasonic scalers, electric pulp testers etc, which could potentially cause pacemaker suppression, resulting in cardiac arrest.⁶ (If cardiac arrest does occur with these patients, turn off all electrical equipment before commencing CPR.)

A patient should not be moved from the dental chair if cardiac arrest occurs. A chair with firm padding has been shown suitable in successful resuscitations including one of the longest successful CPR scenarios.^{7,8} However, for chairs with softer padding a short rigid cardiac board is necessary to have ready to place behind the patient. It will take vital time and two, or more likely three, persons to safely shift an adult patient to the floor. Additionally, standing CPR is far easier and much less fatiguing, (and therefore more effective over time) than kneeling CPR. Also, as dental

surgeries are confined spaces, access to do resuscitation is extremely difficult if the patient is transferred to the floor. The chair is therefore laid flat, and in order to prevent the chair rocking, a dental stool can be adjusted and placed under the head of the chair. If regurgitation or vomiting occurs, the rescuer rolls the patient towards himself/herself and the upper airway is then aspirated with a disposable oropharyngeal sucker.

In conclusion, this emergency involved successful defibrillation of a patient who suffered cardiac arrest in the dental chair.

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