

Original article

Medical emergency in dental practice: defibrillation equipment of French dental surgeons

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Abstract – Cardiac arrest is a significant medical emergency that can occur in outpatient medical facilities. Early defibrillation has been demonstrated to be critical to an individual's survival of a cardiac arrest. The 2010 guidelines of the European Resuscitation Council advocate that defibrillators should be available throughout outpatient medical facilities, including dental offices. Nevertheless, the underwhelming amount of available data showed that dental offices were under equipped with defibrillators.

Objective: The aim of this study was to assess the prevalence of defibrillation equipment in dental offices. Additionally, this assessment also surveyed non-equipped offices regarding their decisions to not have a defibrillator.

Design and Subjects: We conducted a prospective study by contacting all dental offices in five randomly drawn French cities of different sizes (Paris, Besançon, Blois, Romorantin-Lanthenay and Gray).

Main Results: Of the 1716 dental offices called, 1358 (79%) were joined and 24 preferred to not answer the questionnaire. Our study indicated only 41 offices (3.1%) were equipped with a defibrillator and 1212 (94%) of the dental offices lacking a defibrillator had no plans to obtain the equipment. The non-equipped practices stated that the device was expensive and not worthwhile as the primary reasons for not having defibrillation equipment.

Conclusions: This study determined that despite the recommendation by the European Resuscitation Council, dental practices in France are under-equipped and reluctant to purchase defibrillation equipment. The possibility of sharing the expense of defibrillation equipment between residents and health professionals of a building and storing the device in an accessible location is suggested.

Mots clés :
arrêt cardiaque /
réanimation
cardiopulmonaire /
cabinet dentaire /
urgence médicale /
défibrillateur

Résumé – Urgence médicale au cabinet dentaire : équipement en défibrillateur des chirurgiens dentistes français. L'arrêt cardiaque est une urgence médicale pouvant survenir dans les cabinets dentaires. La défibrillation précoce est un élément critique de sa prise en charge. Les recommandations 2010 du Conseil Européen de Réanimation préconisent l'équipement de tous les cabinets de soins extrahospitaliers, donc des cabinets dentaires. Les rares études disponibles suggèrent que les cabinets dentaires sont sous-équipés.

Objectif : L'objectif de cette étude est d'évaluer la prévalence des défibrillateurs dans les cabinets dentaires de plusieurs villes françaises. Nous avons également recherché les raisons expliquant l'absence d'équipement.

Matériel et méthodes : Nous avons réalisé une étude prospective en contactant par téléphone tous les cabinets dentaires d'omnipraticien de cinq villes françaises de différentes tailles tirées au sort (Paris, Besançon, Blois, Romorantin-Lanthenay et Gray).

Résultat : Parmi les 1716 cabinets appelés, 1358 (79 %) ont pu être joints, 24 n'ont pas souhaités répondre au questionnaire. Notre étude montre que seulement 41 des cabinets dentaires contactés (3,1 %) étaient équipés d'un défibrillateur et que 1212 des cabinets non équipés (94 %) ne prévoyaient pas l'achat d'un défibrillateur. Les principales raisons invoquées par les praticiens pour expliquer l'absence d'équipement sont le prix du matériel et son inutilité dans un cabinet dentaire.

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Conclusions : Cette étude montre que malgré les recommandations scientifiques actuelles, les cabinets dentaires français sont sous-équipés en défibrillateur. La possibilité de partager le coût de l'équipement entre plusieurs professionnels de santé d'un même immeuble pourrait être une solution.

Treatment of cardiac arrest with early defibrillation can result in improved survival outcomes. The European Resuscitation Council's (ERC) 2010 guidelines advocate defibrillators should be accessible throughout all outpatient medical facilities, including dental practices. Moreover, the guidelines require that all healthcare providers are trained and can execute defibrillation and cardiopulmonary resuscitation (CPR) [1].

Occurrence of cardiac arrests in dental offices is low (0.002 per dentist per year) but, several studies indicate dental surgeons can be confronted with patients suffering this medical emergency [2-5]. The availability of defibrillation equipment to dental staff could affect the prognosis of patients experiencing cardiac arrest. A 2005 study indicated only 2% of dental practices in Germany contained defibrillation equipment [4]. The British Resuscitation Council as well as several international dental publications recommends dental offices be prepared for medical emergencies such as a cardiac arrest by having suitable access to a defibrillator [6-10]. The objective of this study was to assess the prevalence of defibrillation equipment in the offices of French general dental practitioners (GDP) in several French cities of different size. Specifically, we intended to evaluate why unequipped practices did not have defibrillators and determine how often offices equipped with defibrillators had needed to use the equipment. For equipped offices, this study also assessed the amount of apprehension GDPs had toward using their defibrillator.

Materials and methods

In aim of being representative of the different kind of general dental offices existing in the country, we investigated several representative cities in term of size. We have randomly drawn five cities: one with more than 250 000 inhabitants, one between 100 000 and 250 000 inhabitants, one between 25 000 and 100,000 inhabitants, one between 10 000 and 25 000 inhabitants and one with less than 10 000 inhabitants.

From october 2010 to august 2011, we conducted a prospective study by calling all general dental practices recognized by the 2010 French dental directory in those five cities: Paris (2 211 297 inhabitants), Besançon (117 599 inhabitants), Blois (46 834 inhabitants), Romorantin-Lanthenay (17 395 inhabitants) and Gray (6088 inhabitants) [11]. To limit variability, the survey was conducted by only two researchers and the questionnaire was identical for each dental office. The duration to complete the questionnaire was approximately 2-5 min. Offices which did not answer on the

first call were recalled four times in three weeks during working hours. The questionnaire covered five issues:

1. Defibrillation equipment: each person interviewed was asked if the office was equipped with a defibrillator.
2. Type of defibrillation equipment: equipped GDPs were asked if the defibrillator was automatic, semi-automatic and how long the office has had the equipment.
3. Usage of the defibrillator: GDPs with defibrillators were queried as to the number of times the equipment was used.
4. Apprehension to using the defibrillator: dental offices with devices were questioned regarding their thoughts about using the defibrillator. We evaluated their apprehension using a 4-point semantic scale with the following choices: highly apprehensive, fairly apprehensive, slightly apprehensive and not apprehensive.
5. Reasons for not having a defibrillator: non-equipped GDPs were asked if they had plans to purchase defibrillation equipment during the next 12 months and if not, their justification(s) for this choice.

Results with a non-normal distribution are expressed as a median, 25/75 percentile, and as percentages for categorical data. Normal distribution has been verified with a Kolmogorov-Smirnov test.

Results

The 2010 French dental directory allowed us to identified 1624 general dental offices in Paris, 56 in Besançon, 23 in Blois, 7 in Romorantin-Lanthenay and 6 in Gray for a total of 1716 general dental offices. Of the 1716 dental offices identified by the 2010 French dental directory, we were successful in contacting 1358 (79%) (Fig. 1). The 358 (21%) dental offices we were unable to contact either displayed incorrect contact information in the directory or were permanently closed. In details, we were unable to contact 337/1624 (21%) dental offices of Paris, 13/56 (23%) of Besançon, 6/23 (26%) of Blois, 1/7 (14%), Romorantin Lanthenay or 1/6 (17%) of Gray. Among the dental practices we joined, 1334 (98%) dental offices answer the survey and 24 (2%) preferred to not answer.

Results from the inquiry indicated a total of 41 offices had a defibrillator (3.1% of the offices having answered the survey). That included 34 dental practices with a defibrillator and 7 having order but yet not received the device. The analysis city by city, found that 40 of the general dental offices from Paris and 1 from Besançon had a defibrillator. None of the offices of Blois,

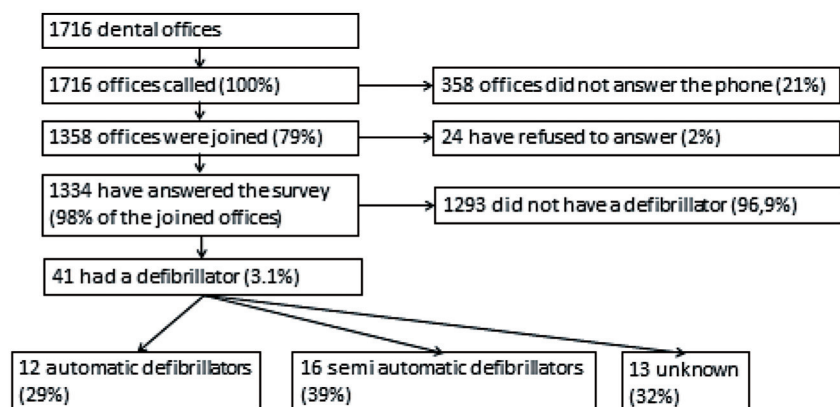


Fig. 1. Study profile.
Fig. 1. Profil de l'étude.

Romorantin-Lanthenay or Gray had a device. The type of equipment included: 12 automatic (29%), 16 semi-automatic (39%) and 13 unknown (32%). The year of the defibrillator equipment ranged from 1998 to 2011 with a median (25/75 percentile) at 2009 (2008/2010). In four cases, the practitioner only remembered that the defibrillator was bought several years ago. None of the 41 general dental offices equipped with defibrillators had used the equipment. However, 30 (73%) GDPs among the equipped ones indicated they were “not apprehensive” toward using their defibrillator, 4 (10%) were “slightly apprehensive”, 1 (2%) were “fairly apprehensive”, 2 (5%) were “highly apprehensive” and, 4 (10%) did not answer.

This study also shows that of the dental offices that did not have a defibrillator, 1212 (94%) were not considering purchasing the equipment during the next 12 months.

The primary reasons given by GDPs justifying this decision included: (1) the futility of having a defibrillator in the dental office, (2) the expense of a defibrillator, (3) no prior need to have such equipment, (4) the absence of thought of this issue, (5) the assumption that a defibrillator was not mandatory in a dental office, (6) the proximity of the retirement, (7) the proximity of dental patients to a physician (the two practices within the same office/building) (Table 1). Several GDPs opted to not give a response while others responded with multiple answers.

Discussion

Results from this study demonstrate defibrillators were prevalent in only 3.1% of general dental offices of those 5 French cities. Several reasons may explain this results in the smaller cities: first because the prevalence of defibrillator is low and we called only 36 dental offices in small cities we may have a size bias for this subgroup of general dental offices and a larger study would have find as many defibrillator in small cities as in bigger ones; secondly in small cities the distance from any point of the city to the hospital or the ambulance station is small which may not encourage the dental surgeon

Table I. Reasons given by dental surgeons justifying lack of a defibrillator in office.

Tableau I. Motifs donnés par les chirurgiens dentistes pour justifier l'absence de défibrillateur dans leur cabinet.

Reasons for lack of defibrillation equipment	n (%)*
I think a defibrillator is not helpful or unnecessary in a dental office	173 (23.9)
I think defibrillators are too expensive	135 (18.6)
I have never needed to use a defibrillator before	77 (10.6)
I have not thought about this problem	63 (8.7)
I think a defibrillator is not mandatory in a dental office	57 (7.9)
I will soon be retired	48 (6.6)
There is a physician in or near my office	45 (6.2)
I am not trained to use a defibrillator	29 (4.0)
I am near an emergency facility or a hospital	26 (3.6)
I do not want a defibrillator in my office	23 (3.2)
There is a defibrillator located near my office (i.e. pharmacy, public place, in the building of my office)	22 (3.0)
I already have an emergency kit with oxygen	15 (2.1)
I do not practice surgery or I do not practice invasive procedures	12 (1.7)

*: expressed as the percentage of total responses

to equip himself; finally dental surgeons in small cities may be more isolated from continuing education organizations which can raise awareness to this issue. Otherwise, our results indicate non-uniformity in regard to the type of defibrillator (automatic or semi-automatic) owned by GDPs. This may reflect the prevalence of numerous models and lack of guidelines recommending a particular type of defibrillator.

Despite recommendations encouraging GDPs to acquire this equipment in their offices, this investigation determined they are reluctant to purchase defibrillators for a variety of reasons. This is one of the key finding of our research, the discrepancy

between the recommendation that dental offices should be equipped with a defibrillator and the reluctance of GDPs to follow this guideline. The response from dental surgeons regarding their plans to purchase defibrillation equipment indicates further recommendation efforts may be ineffective. Specifically, GDPs consider defibrillation devices to be unbeneficial due to the minor occurrence of cardiac arrests at the dental office. The study by Collange *et al.* determined only 1 in 20 dental practitioners will be confronted with a necessity for CPR during their career. According to their study, the likelihood for dental surgeons to witness a cardiac arrest is more substantial in their personal lives than their professional workplaces [2]. Furthermore, our results show general dental offices with defibrillators have never used their equipment.

Mediating a solution between dental surgeons without defibrillators and the ability to begin treatment of cardiac arrest with early defibrillation is an important objective. The ERC advocates for defibrillators to be accessible not only in outpatient medical facilities but also in residential areas as 60–80% of cardiac arrests occur at home and early defibrillation treatment to be initiated within three minutes of cardiac arrest [1]. As dental offices are typically located in residential areas, we suggest a common-use defibrillator be set-up in a location accessible by both residents and dental office personal. This opportunity would reduce the economic burden to dental offices, increase the total number of accessible defibrillators and increase the likelihood that early treatment of cardiac arrest would occur. The limitation of this solution would only be in selecting a location such that the defibrillator can be quickly accessible day or night. Moreover, this solution could be extended to all health offices in the same building, including medical offices and pharmacies.

Contacting exhaustively all French general dental practitioners is not easy; to our knowledge, this is the larger study evaluating the ratio of dental offices owning defibrillation equipment in France. Furthermore this study has been realized in five different cities representing the different size of possible urban area in France. Our results are in accordance with the study of Müller *et al.* which determined, in 2005, only 2% of 620 German dental offices own defibrillation equipment [4].

The limitations of this investigation are that the even if the survey was realized in several cities of different size, we did not contact all French dental offices. Because dental surgeons have busy schedules the questionnaire could not be lengthened. Furthermore, our proposed strategy should be further evaluated to determine practicality and to ensure a favourable response from healthcare providers.

Conclusion

Despite the benefit of early defibrillation in the treatment of cardiac arrest, only a small percentage of dental offices have access to a defibrillator. These surgeons doubt the practicality of a defibrillator in a dental office and thus, have no desire to purchase this critical device. Our investigation suggests a common-use defibrillator shared between occupants of a building (i.e. residents and health professionals) should be considered.

Competing interests: none

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