Acute medical complications and the medical risk-related history in the general dental practice
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CHAPTER 7

Discussion and conclusions
The five studies presented in this thesis concern both dentistry and medicine. Recent developments in both areas demand that more attention is given to the patient's medical condition. If the patient's condition can interfere with dental treatment, the dentist can 1) make a more individual adapted dental treatment plan and 2) try to improve the patient's medical condition by reducing his medical risk (ASA risk score system).

In Chapter 2, 29,424 patients out of 50 general dental practices were examined by means of the MRRH. It was found that 78.0% of the patients were in ASA category I, 22.0% of patients were to a greater or lesser degree medically compromised (ASA category II, III or IV). A positive relationship between age and both ASA score and the number of medical problems was found. For example, in age category '18-24' some 4.6% of patients had a score of ASA III or IV. A relative increase in ASA III and IV scores was recorded for patients aged 45-54, while in age category '75 and older' this percentage rose to 34.9%.

Concerning the number of medical problems, 17.2% of patients had one medical problem, while 4.8% recorded two or more medical problems. In the age category '18-24', 0.3% of patients had three or more medical problems, as opposed to 11.2% in the age category '75 and older'.

The medical conditions which increased with age were hypertension and cardiovascular, neurological, endocrinological, infectious, and blood diseases.

Chapter 3 describes a pilot study conducted among 51 dentists who used the MRRH and 420 controls. During the registration period of one and a half year, 6 dentists of the MRRH group and 85 dentists of the control group spontaneously reported medical complications. In 15 accidents medical aid was required but no life threatening accidents were reported. An anonymous survey afterwards showed that 33.4% of 380 responders reported an additional 300 accidents. Medical aid was required in 38 of these cases.

In Chapter 4 recommendations of the study in chapter 2 were carried out. During a registration period of 1 year, dentists who used the MRRH (reference group) and dentists who did not (control group) sent in monthly registration forms. If no form was received from the dentist he was contacted by telephone.

The reference group had previously attended a one-day introductory course devoted to the MRRH system. Group sizes were originally set by a power analysis. Only patients over age 18,
who had given their informed consent were included. The medical complications recorded were diagnosed independently by two internists. A total of 208 medical complications were reported: 45 by the 62 dentists of the reference group and 163 by the 215 dentists of the control group. Some reports did not evaluate vital signs; this is reflected in categories such as, 'no diagnosis', 'collapse etc' and 'others'. Pulse rate and frequency of breathing were more noted by the reference group. The reference group recorded a relatively lower percentage of complications due to intravenous injection of local anesthetics. We attribute the latter result to the one-day introductory course of the reference group. In this course attention was given extensively to the prevention of intravenous injections by use of an aspiration syringe. There was no difference in the number of medical complications recorded in the two groups but the nature of these complications differed.

**Chapter 5** describes a survey that was conducted two months after the inventory of medical complications among the 277 general dentists (chapter 4). Differences were examined between the reference and control group with regard to practice patterns, medical education of the dentist involved and opinions concerning the registration of medical complications of dentists and patients. Also considered were differences between the nature of the medical complications and the dentists that had (or had not) recorded a medical complication. The overall response on the survey was 87.4%. The reference group (n=60) had undergone more medical training after graduation and took a medical anamnesis (MRRH) of more patients than the control group (n=182). A higher percentage of the control group indicated that the registration was much of an effort. These above-mentioned differences turned out to be not caused by the group of dentists who has registered one or more medical complication. Dentists who registered medical complications turned out to be comparable.

**Chapter 6**: European countries have to abide by the same regulations with respect to dentistry, as laid down by the advisory committee of the European Commission. Among nine European countries an inventory was drawn up on relevant legal and ethical norms with regard to medical histories in dentistry. An inventory was made of diseases that occur relatively frequently and the use of the MRRH was evaluated. In addition the acceptance and use of the ASA risk score system was assessed and a consensus on a European MRRH was achieved.
Point of criticism here and throughout the thesis can be that the dentists were not selected randomly and blindly assigned to the reference group (and control group). Generalizations to the Dutch population of dentists can therefore be made only with substantial caution. In order to deal with this problem a few key variables are compared to population values, with positive results. Chapter 5 describes that the reference and control groups are comparable on the listed variables.

Interest in medical issues and capability to make time available turned out to be important. Because of the fact that using the MRRH-system was not very established, more dentists were were willing to participate in the control group. This explains the relative difference in group sizes between control and reference group.

Another point of criticism is the absolute size of the groups. A larger reference group in chapter 3 could probably change the ‘relative’ difference in nature into a ‘significant’ one. No relevant information on this matter was available at the time of the power analysis, therefore it was not taken into account. The ‘paper’ patient the two internists had to investigate in this study is a less perfect solution. By means of open questions on the registration form and a list of possible symptoms we tried to complete the image of the occurred medical complication as much as possible. A medical expert present at every acute situation would have been the optimal solution, but in practice unrealistic.

And finally, there is also an uncertain element characteristic to international research with respect to the translations. The participants in the study described in chapter 5 were extensively informed on the topics of the MRRH and received an English copy of a MRRH. They were requested to make use of a sworn translator for a reliable translation into their own language.

Besides the small error in the title (EMMRH should be EMRRH), the published version (chapter 6) should have contained some extra details. The results section needs additional information, one could mention that data were gathered during one year and discussed in the workshop. In only three of the participating countries dentists are required to keep a medical history; one participant also refers to this as an ethical norm. In Germany the ethical and legal norms differ for the various ‘Bundesländer’. Two countries report a legal obligation to inquire whether a patient is pregnant. The MRRH was not considered to be ‘easy in use’. Moreover, 51% of the dentists consider certain MRRH questions redundant. When asked what percentage of patients had trouble understanding one or more MRRH questions 57% of the dentists reported difficulties among less than 10% of their patients. 6% reported problems among 10-20% and some 27% reported problems among 20-50% of their patients. In an
extensive discussion adjustments to the MRRH were made and a consensus was reached on an EMRRH. After the discussion and validating five questions were left out, 13 questions adapted and one question remained unchanged. Just as the MRRH-system the EMRRH was linked to the ASA-risk score system.

In the thesis ‘On quality of dental care’ three aspects were considered important to the quality of a professional dental practice. Mentioned are the dentist’s attitude toward his patient, the methodical-technical treatment, and the organization of his practice. Safety relates to the two last mentioned aspects. For instance, with respect to organizing the practice, communication with medical experts and emergency preparedness are relevant. In order to ensure safe dental care it is necessary to be aware of the medical status of the dental patient. Health status assessment, an important thread through this thesis, has several aspects. In the thesis ‘Health status as a measure of outcome of disease and treatment’ a distinction is made between four perspectives and their consequences. The societal perspective involves decisions in the public domain concerning the distribution of funds over areas. The health care policy perspective is of importance to the regional, local or institutional distribution of funds. Research questions focus, for example, on the relative importance of screening programs. The patient group perspective concerns decisions for treatment preferred for a specific group of patients. It provides information on the health status to be expected for the individual patient. And finally, the individual patient perspective decides on the best treatment for an individual patient. This thesis concerns the patient group perspective and tries to raise arguments on the health care policy perspective. Whether the international cooperation (Chapter 5) will succeed to get politicians and decision makers in other countries enthusiastic, which in turn could strengthen support for the MRRH within the Netherlands, remains unclear.

What does become clear is that a part of the dental patients that visit the general dental practice is medically compromised. The MRRH is a way of detecting medical compromised patients. If necessary their dental treatment can be adapted or their medical condition can be improved. Furthermore, the research concerns general dental practitioners, their medical complications in a fixed time span and the quality of their medical preparedness. A lack of registering vital signs and a large number of intravenous injections are found. A relative difference in the nature of medical complications between reference and control group is found. Besides this, the last chapter handles on the first attempt to come to international harmonization of prevention by means of the MRRH.
Chapter 7: Discussion and Conclusions

Recommendations

In chapter 3 it becomes clear that the number of medical complications reported are not significantly different between reference and control group. However, between the two groups a difference in the nature of the medical complications was found. A continuing study should point out how this difference in nature of medical complications can be explained in detail. Does a dentist from the reference group consult a doctor in every case of a medical compromised patient? Are the directives linked to the ASA criteria exactly followed?

In order to make stronger supplementary arguments, in my opinion, we should focus more on the different groups of medically compromised patients. For instance, the evaluations of the dental treatment in the GDP of a group of patients with cardiovascular disease of a certain ASA risk score. Furthermore, an inventory of medical complications should include a question on blood pressure and position of the patient before the medical complication occurred. The first question was left out of the registration form, because dentists in the Netherlands were not used to take blood pressure. Given the number of registered acute medical complications (chapter 4) and the number of patients with medical problems that can interfere with dental treatment (chapter 2), dentists should consider the medical condition of their patients. Using the MRRH-system and adapting dental treatment seem to have an effect on the nature of the complication that the dentist encounters in his or her dental practice.

References

Summary in Dutch
‘Acute medische complicaties en de medische risico gerelateerde anamnese in de algemene tandheelkundige praktijk’

Hoofdstuk 2 getiteld ‘Detecting the medically compromised patient in dentistry by the Medical Risk Related History; A Survey of 29,424 Dental Patients in the Netherlands’ bevat een studie onder 29,424 patiënten van 50 tandartsen die onderzocht zijn m.b.v. de MRRH. 78,0% bleek te behoren tot ASA categorie 1, 22,0% was in meer of mindere mate medisch gecompromitteerd (ASA categorie II, III, IV). Er bleek een positief verband tussen leeftijd van de patiënten en de ASA score en tussen de leeftijd en het aantal medische problemen. Zo had 4,6% van de mensen uit leeftijdscategorie 18-24 jaar een ASA score van III of IV. Een relatieve toename werd gevonden in de leeftijdscategorie 45-54, van de patiënten van 75 jaar of ouder had 34,9% een ASA score van III of IV. Wat betreft het aantal medische problemen; 17,2% had een medisch probleem, 4,8% had twee of meer medische problemen. In de leeftijdscategorie ‘18-24 jaar’ had 0,3% drie of meer medische problemen tegenover 11,2% in de categorie ‘75 jaar en ouder’. De medische condities die qua aantal toenamen met leeftijd waren hypertensie, cardiovasculaire -neurologische -, infectie - en bloed ziekten.

Hoofdstuk 3 getiteld ‘Medical complications in the dental practice; report of 471 dentists in the Netherlands’ beschrijft een voorstudie die gehouden werd onder 51 tandartsen die de MRRH gebruikten en 420 die deze lijst niet gebruikten. Gedurende een anderhalf jaar durende registratieperiode meldden 6 tandartsen die de MRRH gebruikten en 85 tandartsen die hem niet gebruikten spontaan medische complicaties. Bij 15 accidenten was medische hulp vereist, maar geen levensbedreigende accidenten werden gerapporteerd. Een anonieme survey achteraf liet zien dat 33,4% van de 380 respondenten een additioneel aantal accidenten (n=300) rapporteerden. Medische hulp was nodig bij 38 van deze gevallen.

Hoofdstuk 4 getiteld ‘Acute medical complications in 277 general dental practices’ bevat een vervolg studie ondergenomen met in achtenning van aanbevelingen van de pilot studie in hoofdstuk 3. Gedurende de registratieperiode van 1 jaar werden door tandartsen die de MRRH gebruikten (referentie groep) en zij die de MRRH niet gebruikten (controle groep)
maandelijks registratie formulieren ingezonden. Indien geen bericht van de tandarts ontvangen was werd hij/zij opgebeld.

De referentie groep had voor de studie een introductie cursus van een dag gekregen die gewijd was aan het MRRH systeem. Groepsaantallen werden in het begin vastgesteld met behulp van een power analyse. Alleen patiënten ouder dan 18, die instemden met participatie, werden in de studie toegelaten. De medische complicaties die gemeld waren werden gediagnosticeerd door twee onafhankelijk erkende internisten. In totaal werden 208 medische complicaties gemeld; 45 door de 62 tandartsen van de referentie groep en 163 door de 215 tandartsen van de controle groep. Sommige meldingen bevatten geen gegevens over vital signs; dit wordt zichtbaar in de categorieën ‘no diagnosis’, ‘collaps eci’ en ‘anders’. Hartslag en ademhalingsfrequenties werden meer genoteerd door de referentie groep. De referentie groep meldde een relatief lager aantal complicaties die te wijten waren aan het intraveneus injecteren van lokale anesthesie. Er was geen verschil tussen de twee groepen in het aantal medische complicaties maar de aard van de medische complicaties verschilde.

**Hoofdstuk 5** getiteld ‘Medical education of dentists and practice patterns related to acute medical complications in the general dental practice’ beschrijft een evaluatie studie die twee maanden na de inventarisatie studie van medische complicaties gehouden is onder de 277 algemene practici.

Verschillen in demografie, medische educatie van de tandarts en meningen over de registratie op zich van zowel de tandarts als de patiënt werden bestudeerd tussen de referentie en de controle groep. Ook werd dit verschil bestudeerd naar de aard van de medische complicatie en naar de tandartsen die wel een complicatie hadden gemeld en zij die er geen hadden gemeld.

De totale response was 87,4%. De referentie groep (n=60) had meer medische training na het afstuderen gehad en nam een medische anamnese van meer patiënten af, dan de controle groep. Een hoger percentage van de controle groep gaf aan dat de registratie veel moeite kostte. Deze verschillen werden niet veroorzaakt door tandartsen die een complicatie hadden gemeld. Geen significante verschillen werden gevonden met het oog op de aard van de medische complicatie. Tandartsen die medische complicaties hadden ingestuurd bleken vergelijkbaar.
Chapter 7: Discussion and Conclusions

**Hoofdstuk 6** getiteld ‘Introductory notes regarding a European Medical Risk Related History (EMRRH) designed for use in the dental practice’:

De Europese landen moeten zich houden aan dezelfde regels t.a.v. tandheelkunde zoals die vastgelegd zijn door de adviescommissie van de Europese Commissie. In enkele Europese landen is een inventarisatie gemaakt van relevante legale en ethische normen in verband met de medische anamnese in de tandheelkunde. Ziekten die frequent voorkwamen werden geïnventariseerd en het gebruik van de MRRH geëvalueerd. Verder werd de acceptatie en het gebruik van het ASA risico systeem vastgesteld en werd een consensus over een Europese MRRH bereikt.