Dental anaesthesia / report of a Joint Sub-Committee on Dental Anaesthesia.

MINISTRY OF HEALTH

Central Health Services Council

STANDING MEDICAL AND DENTAL ADVISORY COMMITTEES

Dental Anaesthesia

Report of a Joint Sub-Committee

LONDON
HER MAJESTY'S STATIONERY OFFICE
THREE SHILLINGS NET

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1967

REPORT OF A JOINT SUB-COMMITTEE ON DENTAL ANAESTHESIA

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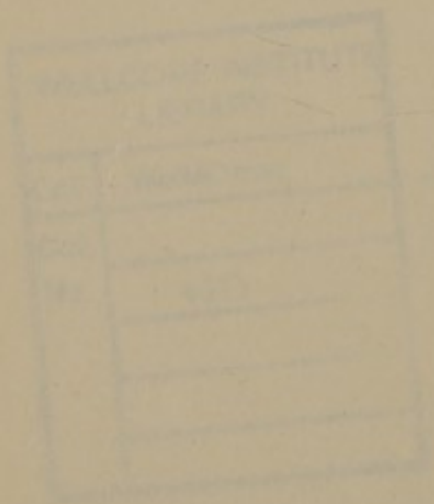

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I. INTRODUCTION

1. We were appointed in July 1965 by the two Advisory Committees as a result of a request by the Minister for advice.

Our terms of reference were:

'To consider the use of general anaesthetics in general dental practice and to advise:

(1) How far the administration of general anaesthetics for conservative treatment can be justified, and

(2) How far the administration of general anaesthetics for any purpose without the attendance of a second practitioner can be justified.'

2. The Advisory Committees agreed that analgesia and sedation should be regarded as within our terms of reference.

II. GENERAL

3. We agreed at our first meeting that our aim should be to give criteria for the safe use of general anaesthetics in dentistry and that we should also advise the Minister, where appropriate, on the minimum standard of practice we thought acceptable (see also Appendix E). We decided that we should take evidence from organisations and persons with knowledge and experience of dental anaesthesia. In addition to those whom we specifically invited, some persons provided written evidence in response to a general invitation published by the Chairman in the medical and dental press. Appendix A lists the organisations and persons who gave evidence.

4. Since any form of general anaesthesia subjects the patient to the risk of complications which may vary from minor morbidity to cerebral damage and, occasionally, death, the safety of the patient is of paramount importance. There is a small mortality rate from general anaesthesia in dentistry (see Appendix B), but the extent of morbidity is almost certainly greater (see paragraph 14).

5. From the safety aspect, because the same drugs are used and dosage cannot always be controlled to produce separate clinically-recognisable levels, we consider it impracticable to draw a distinction between anaesthesia and analgesia, whether produced by inhalation or by intravenous injection. Our comments on standards of safety should be regarded as applying to both.

III. ASSESSMENT OF PATIENT'S FITNESS FOR GENERAL ANAESTHESIA

6. The patient's fitness for general anaesthesia may be affected both by his physical condition and by treatment for a medical condition which he may currently be receiving. Ideally the patient's fitness should be confirmed pre-operatively by a report from the patient's regular medical practitioner. The anaesthetist should invariably carry out as a routine an assessment of the patient's fitness by (a) questioning about medical history and past and present treatment, and (b) careful observation (for example, of any breathlessness after slight exertion). This procedure should help to show whether drugs

which might cause an adverse reaction in the anaesthetised patient are being or have recently been taken and whether general anaesthesia is contra-indicated by the patient's physical condition. If any unusual feature is revealed or suspected, the advisability of administering a general anaesthetic in the dental chair should be reconsidered after the patient's medical practitioner has been consulted. (See Appendix E for further suggestions on the selection of patients for general anaesthesia.)

IV. JUSTIFICATION FOR THE USE OF GENERAL ANAESTHESIA IN DENTISTRY

7. Anaesthetics by themselves have no therapeutic effect; their value to the patient is limited to the value of the operation for which they are given. Operation and anaesthesia therefore cannot be regarded as two distinct entities when considering the justification for giving a general anaesthetic. It follows that the dental procedure should justify general anaesthesia.

8. It appears to us that the reported increased demand for general anaesthesia for conservative dentistry in this country may be due partly to publicity which has not indicated adequately the hazards involved. We recommend from a consideration of the factors discussed below (see paragraphs 14 and 15) that general anaesthesia for dentistry of any kind should only be considered when there are clinical indications of the need for it. Modern local analgesic methods permit dentistry to be carried out painlessly for most patients without any of the hazards of general anaesthesia, and we had this in mind when we came to the conclusions contained in paragraph 9. The operating dental surgeon is generally able to influence his patient to accept that method of rendering the operation tolerable which he considers to be in the patient's best interests, even though the ultimate responsibility for determining the type of anaesthetic to be administered rests with the anaesthetist. The choice of anaesthetic must, of course, always be determined by the safety of the patient rather than by the convenience of the operator.

V. INDICATIONS FOR GENERAL ANAESTHESIA FOR CONSERVATIVE TREATMENT

9. The administration of a general anaesthetic for conservative treatment will often be of long duration and its justification therefore needs to be considered in the light of the factors discussed in paragraphs 13 and 14. We believe that the following are the main classes of patient whose clinical condition may justify general anaesthesia for conservative work in general dental practice:

(a) Spastics, or others who, because of physical infirmity, would be uncontrollable under local analgesia.

(b) Those who are known to react adversely or to be resistant to local analgesics.

(c) The mentally subnormal.

(d) Those whose psychological attitude to dentistry is such that they would refuse from fear any form of dental treatment not performed under anaesthesia and who, in the opinion of the dental surgeon, are unsuitable for local analgesia.

10. The opinion of those who gave evidence to us, when asked about the proportion of patients for whom general anaesthesia for conservative treatment was justified, varied widely, from 1 per cent. to (in the view of a minority) 95 per cent. The majority thought it was justified in no more than 5 per cent., and we think this is a reasonable estimate.

VI. HAZARDS OF GENERAL ANAESTHESIA IN GENERAL DENTAL PRACTICE

11. Appendix B analyses, by type of anaesthetic, sex and age of patient, type of operation and place of death (i.e. hospital or elsewhere), the 51 reports of deaths with mention of dental anaesthesia in England and Wales during the seven years 1959-65. The proportion of deaths in hospital probably indicates that these patients had been referred there for reasons such as their age or physical condition. There was a considerable reduction in the number of such reports (in England and Wales) between the periods 1952-56 (87 deaths) and 1961-65 (31 deaths) but until a very much smaller number of deaths can be reported concern must continue to be felt. No risk to life on account of a dental procedure is ever justified except in the extremely rare event of the dental condition itself constituting a lethal hazard to the patient. We recognise that even if all dental anaesthetics were administered under ideal conditions any change in the mortality rate would be numerically small, but we feel that this should not lead us to condone standards which might involve a single patient in avoidable risk.

12. We felt we should give an indication, even if approximate, of the extent to which general anaesthesia is being given for dental treatment in this country. Available figures for the general dental services (see Appendix C) and the local authority dental services, together with an allowance for the much smaller number of anaesthetics given in hospitals (on which we have no precise information), indicate that slightly more than one and three-quarter million general dental anaesthetics were administered in England and Wales during 1965. We had no information on the number of anaesthetics administered outside these fields.

13. The short duration of most dental operations in the chair is probably one of the main factors leading to a low mortality risk. That most of the general anaesthetics administered in general dental practice are of short duration is suggested by an analysis of the operating time in 167 consecutive cases in which general anaesthesia was given in dental surgeries for National Health Service patients. In 54 per cent. of the cases the dental practitioner's operating time was less than one minute and in a further 25 per cent. between one and two minutes. Of the remainder, 14 per cent. needed between two and three minutes and 6 per cent. between three and five minutes (Goldman, 1964). From observations of 312 administrations of general anaesthesia to ambulatory patients for the extraction of teeth in London teaching hospitals and 169 administrations at clinics of the School Dental Service, the time taken by the practitioner in performing the extractions was less than one and a half minutes in two-thirds of the teaching hospital cases and did not exceed one minute in any of the clinic cases (Bourne, 1960).

14. Experience of general anaesthesia in other fields suggests that any lengthening of the average period of unconsciousness during general anaesthesia in

the dental chair must inevitably increase the risk, and the dental practitioner and his anaesthetist must always consider very carefully whether this increased risk is justified. The full extent of the morbidity associated with anaesthesia for dental purposes is difficult to assess and more investigation of this feature is required. Examples of more serious complications which can be expected are the initiation of coronary thrombosis, an increased risk of ischaemia of the heart and brain and of anoxic damage to these organs, and an increased incidence of vomiting with its consequent risks. Some of these ill effects may not become evident until some time has elapsed and may then fail to be connected with the administration of the anaesthetic. We consider that minor degrees of morbidity may be more common than is evident from the few published cases.

15. There has been a trend for some years to supplement nitrous oxide with more powerful drugs. By this means the hypoxia so common with high concentrations of nitrous oxide can be avoided, and a tranquil anaesthetic ensured in a well-oxygenated patient. The supplementary drugs may take the form of premedication, e.g. pethidine by injection, barbiturates or phenothiazine drugs by mouth, or of the addition of vapours such as halothane or trichloroethylene, or of the intravenous injection of short-acting barbiturates at the commencement of or during the nitrous oxide administration. The benefits of such combinations to the patient, and perhaps even more to the operating dental surgeon, are considerable. However, it must not be overlooked that, inevitably, new hazards are introduced and considerable experience and skill are required if these risks are to be minimised. Since these combinations of nitrous oxide with adjuvant drugs and vapours are used for anaesthesia of even short duration, the hazards against which precautions must be taken with the short anaesthetics are now approaching those associated with the longer ones, and in these new circumstances there is no longer the same distinction as formerly between short and long anaesthesia in regard to safety. The adjuvant drugs introduce the additional hazard of incorrect dosage, for their action in general is more prolonged that that of nitrous oxide. There may be considerable biological variation between individuals in their reaction to drugs, and in the ordinary circumstances of short dental anaesthesia it is difficult to adjust the dosage to allow for this variation. Another hazard which is now becoming important concerns patients who are being treated with drugs for some intercurrent disease. For example, adjuvant drugs like pethidine may cause dangerous effects in patients being treated with various tranquillisers while most anaesthetics and adjuvant drugs may cause marked cardiovascular depression in patients receiving corticosteroids. These aspects are considered in more detail in Appendix E. We draw attention in paragraph 18 to certain particular hazards of the use of barbiturates in general anaesthesia.

VII. USE OF INTRAVENOUS AGENTS FOR DENTAL ANAESTHESIA

16. The so-called short-acting barbiturates for intravenous use began with hexobarbitone (Evipan) in 1932. This was later to be largely replaced by thiopentone. Very soon the value of inducing anaesthesia with one of these short-acting barbiturates became apparent to dental anaesthetists in much the same way as it began to be widely appreciated for general surgery. In dental

surgery, with a suitably small dose and followed by nitrous oxide and oxygen, recovery is still rapid with a minimum of after-effects, and, apart from the need for some extra post-operative rest, there are few after-effects additional to those which normally follow nitrous oxide/oxygen alone.

17. It is against this background of established usage of an intravenous barbiturate as an induction agent before inhalation anaesthesia that the newer developments in dental anaesthesia should be viewed. These consist of two quite separate though related practices. In the first, an intravenous barbiturate (e.g. methohexitone) is administered as an induction for inhalation anaesthesia. In the second, the intravenous barbiturate is given not for induction but as the total anaesthetic in the manner described in paragraph 18. It is in regard to this second development that we have some anxiety. We feel that this particular technique has a place in dentistry but that it has certain features which require it, like any other form of general anaesthesia, to be the sole responsibility of a trained and experienced administrator. Those who are enthusiastic about this method claim that by regulation of the dosage it is possible to achieve an 'ultra-light' level of anaesthesia so that it becomes suitable for prolonged conservative dental treatment without the need for routine endotracheal intubation. We consider that it is generally difficult to control the dosage in such a manner as to keep anaesthesia at this light level consistently or to ensure a clear airway at all times without great vigilance, necessitating the presence of a trained anaesthetist in addition to the operator. The depth of anaesthesia is bound to fluctuate, either because of the occurrence of painful stimuli or by reason of the difficulty of judging the dose with the required degree of accuracy. This was confirmed by the observations of many of those who gave evidence. In any case, a varying degree of hypoxia may occur during intravenous anaesthesia, however light the plane of anaesthesia may be. It is true that hypoxia can be remedied either by the inhalation of oxygen or of an oxygen-rich nitrous oxide mixture. In our opinion, however, this requires additional equipment and the presence of a separate trained anaesthetist, and we are concerned to note that the latter does not appear to be deemed absolutely necessary by the proponents of the 'ultra-light' method of administering intravenous barbiturates.

18. The barbiturate now most often used intravenously in dentistry is methohexitone. The 'ultra-light' technique with this drug consists essentially of the administration of successive small doses, increments being given whenever they are considered necessary to enable the operation to continue. Inevitably the technique produces a fluctuating depth of anaesthesia. Methohexitone possesses the general properties of the barbiturates which, when given intravenously, depress respiration and which will, with increasing dosage, eventually produce apnoea followed, if recovery occurs, by a gradual return of respiratory function. The depth of respiration at any moment depends on the degree of depression of the central nervous system. The barbiturates in general have little powers of pain relief or of abolishing the motor responses to pain and if the patient is unconscious, so long as he is breathing adequately, he is likely to be reactive in varying degree to painful stimuli; any attempt to produce a state of immobility akin to general anaesthesia in the presence of powerful painful stimuli is likely to be accompanied by serious respiratory depression. Some patients, such as young nervous adults, may even become violent and

uncontrollable when under the influence of barbiturates. The response of patients under barbiturates to stimulation is particularly marked in epileptics, and there have been reports of such patients who have developed convulsions in these circumstances (Galley, 1963, 1964, Green, 1963, Gruber, *et al.*, 1957, Kiersley, Bickford and Faulconer, 1951, Vickers, 1963).

19. We should mention that a point to be considered when comparing the safety of intravenous agents with that of nitrous oxide is that if the administration has to be stopped for any reason recovery is quicker with nitrous oxide, provided the airway is patent, the circulation intact and the patient breathing, than with agents which are not excreted through the lungs.

20. The after-effects of general anaesthesia or of sedation (see paragraphs 23 and 24) must always be considered and the patient warned not to drive a car and to restrict his activities, especially the use of machinery, until the following day. This is specially important in the case of barbiturates and other agents which are not eliminated through the lungs. A recent report on the influence of drugs on driving has indicated that even hypnotic doses of a barbiturate may impair overall driving efficiency for as long as fourteen hours after administration (Perry and Morgenstern, 1966).

21. A further factor to be considered is that when inhalation anaesthetics are used the apparatus generally has provision for the administration of oxygen should the need arise. With intravenous anaesthesia, if apparatus for administering oxygen is not used the patient has to depend upon oxygen from the air, perhaps in the presence of partial respiratory obstruction. This factor is particularly important with children, whose airways are smaller and for whom the risk of adverse reaction to the anaesthetic is greater.

22. It is interesting to note that the replies to enquiries made in other Western European countries and the United States of America suggested that there was no general trend in these countries towards the use of intravenous anaesthesia for conservative treatment.

VIII. SEDATION COMBINED WITH LOCAL ANALGESIA

23. Techniques such as that advocated by Jorgensen and associates (1961, 1963) have been developed to enable operative procedures to be carried out under local analgesia on a conscious but nervous or handicapped patient who has been rendered relaxed and co-operative as a result of the pre-operative injection of sedative drugs intravenously followed by the injection of a local analgesic at the site of operation. Whilst these procedures do not appear to be entirely satisfactory, particularly in children under 10 years of age, they seem to provide an alternative to general anaesthesia for conservative work in certain older patients. Although the patient is able to leave without delay after treatment, he must be accompanied home by an adult as the sedative effect will last for three to four hours or longer.

24. Such techniques when properly and expertly carried out may have a limited place in dentistry but have the dangers inherent in intravenous administration of barbiturates (see paragraphs 16-21). It should be borne in mind that any method which involves the administration of such drugs as pethidine and barbiturates will produce marked respiratory depression in susceptible subjects,

and that the repeated administration of pethidine carries the risk of causing drug dependence.

IX. ADMINISTRATION OF GENERAL ANAESTHESIA BY THE OPERATOR

25. We believe that the administration of general anaesthesia and the performance of dental surgery require the individed attention of anaesthetist and operator respectively and we are strongly of the opinion that these roles cannot be combined without risk.

26. We have considered whether the use of intravenous agents at 'ultra-light' levels should be regarded as 'general anaesthesia' for this purpose, but, as discussed in paragraphs 17 and 18, we think that it cannot be separately distinguished, since the level of anaesthesia is bound to vary with intermittent administration, and that, like other methods of general anaesthesia, the technique should receive the administrator's undivided attention.

27. In some regions where the services of dental anaesthetists are not readily available, or there is inadequate liaison between anaesthetists and dental surgeons, some practitioners state that they find themselves obliged to act as operator-anaesthetists to relieve severe pain or deal with acute infection when the patient has arrived at an unusual hour or when no other practitioner is available. We have considered this situation and can understand the problem facing the practitioner, but, since some risk to the safety of the patient is involved, we cannot approve the practice. We consider that it is particularly important in such regions that steps should be taken to improve dental anaesthetic services and the liaison between such services and dental practitioners. This will accelerate the present trend—arising from the possibility of postponing the extraction, e.g. by obtaining drainage or by the administration of an antibiotic or sedative—for these emergency operations to become less frequent. It should lead eventually to an end of the practice of acting in the dual role of operator and anaesthetist, against which, we understand, the societies concerned with defence and protection of the medical and dental professions advise their members.

28. We have also considered a suggestion that the place of a second practitioner might be taken by a chairside assistant trained by the operator to help with the administration of anaesthesia. We feel that, however experienced, such a person lacks the fundamental knowledge to administer an anaesthetic safely or even to help effectively in an emergency.

29. Provision is made in the general dental services for the payment of a fee for the administration of a general anaesthetic in connection with extractions 'where the anaesthetic is administered by the dentist carrying out the extraction'. We understand that this is still paid because of the considerable (although declining) proportion of cases in which general anaesthetics are given in these circumstances (see Appendix C). It was suggested to us that the inclusion of this item in the scale of fees is responsible for encouraging the continuation of this undesirable practice. We do not know how far this is true.

X. TRAINING IN GENERAL ANAESTHESIA FOR DENTISTRY

30. The use of dental anaesthesia cannot be considered without reference to the training of the anaesthetist and the subject has been mentioned repeatedly in the evidence we have received. It is helpful to view this matter in perspective. When general anaesthesia first became established as a means of relieving the pain of dental extractions, only one method was used: the 'straight gas', in which the patient breathed 100 per cent. nitrous oxide until unconscious and, after the face mask had been removed, extractions proceeded during the recovery period. Later, a mixture of nitrous oxide and air or of nitrous oxide and oxygen was administered via a nasal mask which permitted the anaesthetic to be continued during the operative period in order to give the operator more time. Nevertheless, this was still a comparatively unsophisticated era and hypoxia was common, with its attendant risks to the patient and inconvenience to the surgeon of the rebellious, jactitating patient. It was possible, however, to teach the technique at undergraduate level because of the inbuilt safety factor of rapid recovery from nitrous oxide. At that time newly-qualified dental surgeons usually worked in dental practices as assistants before becoming principals themselves. They therefore received a good deal of practical post-graduate experience in simple nitrous oxide dental anaesthesia. This is not now generally the case. Nowadays, anaesthesia for dental operations is little different from anaesthesia for surgery in other parts of the body. It is more complicated than formerly and involves the use of a wide range of drugs and techniques. The former short period of practical postgraduate experience no longer suffices. This perhaps explains why those submitting evidence were generally agreed that dental and medical undergraduate training can no longer be regarded as being sufficient for those wishing to give general anaesthetics for dental purposes and that some form of postgraduate training is needed. Although dental anaesthesia involves the application of knowledge common to anaesthesia in general, we recognise that it has technical expertise which presents difficulties to those not specially trained in this field. On the other hand, we received evidence, with which we agree, that medically-qualified anaesthetists who are otherwise fully trained rapidly acquire such expertise when given the opportunity of supervised experience in dental anaesthesia.

31. While it is necessary that medical and dental undergraduate students should be acquainted with the principles of general anaesthesia as part of their general education, it is doubtful if it is possible in the short time normally made available in the undergraduate curricula for students to become competent and safe in the use of modern anaesthetic procedures. It seems to us that undergraduate instruction, including any clinical practice, should concentrate at an elementary level on the principles of anaesthesia, on the pharmacology of the drugs used and the risks inherent in their administration, on the basic conditions for safety, and on resuscitation. After graduation those wishing to become proficient in the practical administration of general anaesthesia should have further training.

32. We appreciate that there is likely to be resistance to the viewpoint that undergraduates cannot in present circumstances be made into competent dental anaesthetists without postgraduate training. General anaesthesia by its very nature must not be undertaken lightly, however short its duration, by

anyone not fully conversant with the effects of the drugs used both in health and disease and with modern methods of resuscitation. This attainment cannot be assured by undergraduate training alone. It is already an accepted view that doctors after graduation need at least one year's full-time training in anaesthesia to fit them even for the anaesthetic work likely to be undertaken by a general practitioner anaesthetist. Dental anaesthesia is a branch of anaesthesia in general and cannot be learned properly in isolation. There is no short cut to competency in its safe administration and we wish to express our doubts about the adequacy of teaching a new technique by means of a two- to three-day course without the proper background of training in anaesthesia.

33. The duration of postgraduate courses will naturally vary with their objective. For example, for those with no postgraduate experience the duration may properly be six months or more, while the needs of the other categories could be met by much shorter courses. Very short courses are, in our opinion, appropriate only for practitioners with considerable previous anaesthetic experience and knowledge.

34. The scope and content of postgraduate courses require consideration by medical and dental schools and other authorities concerned with training. They will have to cater for the needs of practitioners of three sorts: those newly qualified who hope to become specialists in anaesthesia; those who have already received special training in anaesthesia generally but who need to acquire the particular technique of dental anaesthesia; and those general practitioners who already have some experience of general dental anaesthesia but who wish to keep abreast of modern developments (see paragraph 38 on courses provided under the National Health Service).

35. In the immediate future many dental anaesthetics will of necessity continue to be administered by dental surgeons or, less often, by general medical practitioners (see Appendix D). It is unlikely, however, that more than a minority of general medical or dental practitioners would be in a position to take even a six-months' postgraduate course in anaesthesia. Those who obtained this training would prove to be an important element in both professions for practising safe, competent dental anaesthesia, and would set the example of a good standard in this field. In the future an increasing number of dental surgeons who had not received postgraduate training might feel less inclined to administer general anaesthesia by reason of their lack of such training. In the long term their numbers would be compensated for by additional medical practitioners who would by then have received adequate training in anaesthesia.

36. Already the number of patients attending the teaching hospitals who need general anaesthesia for dentistry is becoming too small to provide a basis for the proper instruction of medical and dental students. In many dental schools the dental students are given preference, sometimes to the exclusion of medical students. In our view, medical students should also be given some experience of general dental anaesthesia to encourage an interest in the subject, although we are aware of the practical difficulties of doing this in those medical schools without a dental counterpart.

37. There also seems to be some doubt whether there would be enough suitable patients to permit the instruction of postgraduates as well as undergraduates. If this proves to be so it may be better to concentrate on practical teaching

for postgraduates even if it is at the expense of the undergraduate. In any case it would be prudent to seek facilities for practical instruction elsewhere than in the out-patient departments of dental hospitals.

XI. ARRANGEMENTS UNDER THE NATIONAL HEALTH SERVICE FOR REFRESHER COURSES FOR GENERAL PRACTITIONERS

38. Under Section 48 of the National Health Service Act, 1946, the Minister may enter into arrangements with Universities for the provision of courses to enable general medical and dental practitioners to keep themselves informed of the latest developments in professional knowledge and may, with the Treasury's approval, make payments towards the cost of such courses and the expenses of practitioners attending them, subject to a maximum of 22 sessions in each academic year. Courses in general anaesthesia are provided under these arrangements. The Ministry pays an agreed fee to the University for each eligible general practitioner who attends a course and contributes towards the practitioner's expenses. (Eligibility is defined for medical practitioners in terms of a minimum number of patients on their lists and for dental practitioners in terms of minimum earnings.)

39. The number of refresher courses arranged under this procedure for general dental practitioners in dental anaesthesia has increased in recent years but we consider there is need for further considerable and rapid expansion in view of the number of anaesthetics they administer.

XII. USE OF SPECIALIST ANAESTHETISTS

40. It was stated at a symposium on 'The Teaching of General Anaesthesia for Dental Surgery' held at the Royal College of Surgeons of England on 4th April 1964 that of general dental anaesthetics given in the dental chair in the National Health Service 80 per cent. were given by dental surgeons, 17 per cent. by general medical practitioners and 3 per cent. by specialist anaesthetists. These figures were quoted to us in evidence as though they were authoritative but we were unable to find any national basis for them. We therefore decided to try to find out whether these proportions could be estimated from an examination of cliams submitted by dental practitioners to the Dental Estimates Board. An examination of a random sample of nearly 7,000 claims involving general anaesthesia from those authorised for payment in November and December 1965 and January 1966 showed that about 45 per cent. of all general anaesthetics in the general dental services during this period were administered by medically-qualified practitioners. A further examination of all claims authorised for payment during two days in February 1966 in respect of general anaesthetics administered by medically-qualified practitioners, over 3,000 claims in all, showed that about 43 per cent. of these anaesthetics were given by practitioners with special training in anaesthetics. These two proportions, taken together, suggested that about 19 per cent. of all general anaesthestics given in the general dental services at the begining of 1966 were given by medical practitioners with special training in anaesthesia (see Appendix D).

41. We have, not unnaturally, given thought to the question of who, under ideal circumstances, should administer general dental anaesthetics and we feel that

ideally all such anaesthetics should be administered by specialist anaesthetists trained in dental anaesthesia. That this view is tacitly admitted by both doctors and dental surgeons is evidenced by the following:

(*a*) Dental teaching schools employ consultant anaesthetists to demonstrate and be responsible for the teaching of dental anaesthesia to dental undergraduates.

(*b*) General anaesthetics in local authority dental clinics are increasingly administered by consultant anaesthetists or other doctors with a special interest and training in dental anaesthesia.

(*c*) The proportion of general dental anaesthetics now administered by anaesthetists with special training (see paragraph 40 and Appendix D).

Several organisations gave evidence that general anaesthesia for dental surgery, like that for other forms of surgery, should be administered only by medical practitioners with special training in anaesthesia. Although this ideal could not be attained for some years, it should be the ultimate object. The speed with which this ideal can be achieved will depend on the rate at which such medical practitioners can be trained as dental anaesthetists and the ultimate demand for general dental anaesthesia.

42. In concluding that it would be to the benefit of the community if ultimately dental anaesthesia were always administered by specially-trained medical practitioners in the same way as is anaesthesia for all other branches of surgery we have taken account of:

(*a*) the degree of risk involved with general anaesthesia in general;

(*b*) the special risks of operations in the mouth;

(*c*) the increasing variety of drugs and complexity of methods used for producing general dental anaesthesia;

(*d*) the greater possibility of dangerous side-effects in patients taking drugs under medical direction for some intercurrent disease (see paragraph 15).

43. As mentioned in paragraph 40 above, the proportion of general anaesthetics given in the general dental services by medical practitioners with special training in anaesthesia had reached nearly 20 per cent. by early 1966. The following considerations might enable this proportion to be increased:

(*a*) The reduction in the number of general anaesthetics by the use of local analgesia wherever general anaesthesia is not clinically necessary, as recommended in paragraph 8.

(*b*) The making of local arrangements for meeting general dental practitioners' needs for general anaesthesia by the organisation of regular sessions attended by anaesthetists with special training in dental anaesthesia. Such arrangements would enable as many patients as possible to be dealt with in each session and so would lead to more effective use of the available anaesthetists. The premises in which such sessions would be held would also be a matter for local arrangement.

(*c*) The encouragement of married women anaesthetists to return to practice.

(*d*) Increased facilities for postgraduate training of medical practitioners in dental anaesthesia (see paragraphs 31 to 34).

XIII. ECONOMIC FACTORS

44. We feel justified in referring to economic factors in as much as these may influence aspects of the administration of general dental anaesthesia which are within our terms of reference. In paragraph 29, for example, we refer to the suggestion that the continuance of the undesirable practice of operator-administered general anaesthesia may be encouraged by the inclusion in the scale of fees for general dental practitioners of a fee for a general anaesthetic given by the dental surgeon carrying out an extraction. It was also suggested to us in evidence that the proportion of general dental anaesthetics given by anaesthetists specialising in dental anaesthesia could be increased by changes in the scale fees for general anaesthetics in the general dental services. We recognise that such factors may influence some of the matters discussed in this report.

XIV. ACKNOWLEDGMENTS

45. We wish to thank all those who gave evidence for their detailed help and the General Register Office and the Dental Estimates Board for statistics included in this report.

REVIEW AND RECOMMENDATIONS

1. It is believed that at the present time about two million general anaesthetics are administered for dental purposes each year in England and Wales. Since any form of general anaesthesia subjects the patient to some degree of risk, and bearing in mind that a dental condition itself rarely constitutes a lethal hazard to the patient, dental practitioners must always consider very carefully whether the degree of risk involved is justified. This consideration is of particular importance when lengthy periods of unconsciousness in the dental chair are involved. A further potential source of hazard arises from the possibility that anaesthetic agents may cause adverse reactions in the increasing number of patients being treated by drugs for some intercurrent disease. We have examined the criteria for safety in dental anaesthesia in some detail in Appendix E.

2. Our terms of reference require us to advise how far the administration of general anaesthetics for conservative treatment can be justified. In the light of the considerations mentioned above we feel strongly that it can be justified only in certain classes of patient whose clinical condition requires it. (These classes are set out in paragraph 9.) The anaesthetic agents most commonly used for conservative treatment are intravenous barbiturates, which carry with them certain risks outlined in our report, and which should not be administered except by an adequately trained and experienced administrator.

3. The second main part of our terms of reference requires us to advise how far the administration of general anaesthetics for any purpose without the attendance of a second practitioner can be justified. We consider that the administration of general anaesthesia and the performance of dental surgery require the undivided attention of anaesthetist and operator respectively and cannot be combined without risk. We therefore deprecate the practice of a dental practitioner acting as his own anaesthetist, whether or not he is using a so-called 'ultra-light' technique. We recognise that in some districts dental surgeons state that they find themselves obliged to act as operator-anaesthetist in emergencies but we consider that emergency dental operations which require the immediate administration of a general anaesthetic should be rare. We consider that in such districts early steps should be taken to improve dental anaesthetic services and the liaison between these services and dental practitioners.

4. Intravenous sedation followed by local analgesia has been considered as an alternative to general anaesthesia for certain patients, for whom local analgesia alone has proved unsatisfactory. It is important that patients who have received sedation should be advised not to drive a car and to restrict their activities until the following day. It is equally important that in considering the use of sedation, enquiries should be made to establish whether the patient has been taking any other drugs which with the sedative might react adversely. Other hazards are discussed in paragraph 24 and Appendix E.

5. Ideally all general dental anaesthetics should be administered by specialist anaesthetists trained in dental anaesthesia. We recognise, however, that this ideal cannot be attained at present and that, of necessity, for some years to come many general dental anaesthetics will be administered by general medical and dental practitioners. We have, therefore, given some thought to the subject of training.

6. We consider that in present circumstances undergraduate training alone cannot produce competent dental anaesthetists and that both medical and dental

practitioners wishing to become proficient in the practical administration of general anaesthesia should have postgraduate training. We recommend that dental and medical undergraduate instruction should be based at an elementary level on the principles of anaesthesia, on the pharmacology of the drugs used and the inherent risks of their administration, on basic safety conditions and on resuscitation. We feel that more medical practitioners would develop an interest in dental anaesthesia if this subject figured more prominently in their undergraduate training and we recommend that medical students should always be given some experience of general dental anaesthesia.

7. We recognise that the number of patients needing general anaesthesia for dentistry is not in all centres large enough to provide a basis for the proper instruction of dental and medical undergraduate and postgraduate students; we consider that it may be better to concentrate the available resources on the practical teaching of postgraduates. It would be prudent to explore sources of practical instruction in general dental anaesthesia other than the out-patient departments of dental hospitals.

8. To enable those general practitioners who are already experienced in general dental anaesthesia to keep their knowledge up to date, there is a need for considerable and rapid expansion of refresher courses provided under Section 48 of the National Health Service Act, 1946.

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APPENDIX A

Organisations and individuals who gave evidence

The following gave written and oral evidence:

Association of Anaesthetists of Great Britain and Ireland
British Dental Association
British Medical Association
Dental Education Advisory Council of the Dental Schools of Great Britain and Ireland
Faculty of Anaesthetists of the Royal College of Surgeons of England
Dr Victor Goldman
*Dr J. I. Murray Lawson
*Mr D. M. G. Main
Medical Defence Union
Medical Protection Society
Mr E. Schofield
Society for the Advancement of Anaesthesia in Dentistry
Society of Dental Anaesthetists

The following gave written evidence:

*Mr J. M. N. Boyle
Dr J. Bullough
Dr J. G. Bourne
*Mr H. Capstick
*Mr C. B. Cormie
*Dr A. M. Danziger
*Dr Massey Dawkins
*Mr P. Dawson
*Mr S. L. Drummond-Jackson
*Mr J. W. S. Dunicliff
*Mr A. F. Fletcher
*Mr W. J. Govan
*Mr H. Gleek
*Dr H. M. Halle
*Mr G. F. Kantorowicz
*Mr H. Mandiwall
*Mr N. McKane
*Mr W. D. Ogilvie
*Mr J. Pearce
*Mr R. H. Pownall
*Dr W. N. Rollason
*Dr M. E. Samrah
*Mr M. J. N. Segerdal
*Mr M. M. Silver
*Mr K. Strauss
*Mr A. C. L. Stubbings
*Mr P. Sykes
*Mr R. M. Vivian

The following gave oral evidence:

Faculty of Dental Surgery of the Royal College of Surgeons of England

*Evidence given in response to Chairman's invitation in the medical and dental press.

APPENDIX B

TABLE 1

Reports of deaths with mention of dental anaesthesia—England and Wales, 1959—1965 inclusive, showing anaesthetic used, sex and age of patients and number of deaths in hospital. Information supplied by the General Register Office.

ANAESTHETIC	Sex	All Ages	Age, Years								
			1–	10–	20–	30–	40–	50–	60–	70–	75+
Nitrous oxide	M	5	1		1		2	1			
	F	6	1	1	2			1	1		
Nitrous oxide plus halothane	M	3			1		2				
	F	2			1					1	
Nitrous oxide plus trichloroethylene	M	4			2	2					
	F	2				1	1				
Nitrous oxide plus relaxant and pethidine	M	1	1								
	F										
Halothane	M										
	F	1					1				
Halothane/ether azeotrope	M										
	F	1	1								
Trichloroethylene	M										
	F	1				1					
Ethyl chloride	M										
	F	1	1								
Thiopentone	M	1			1						
	F										
Thiopentone plus relaxant	M	1		1							
	F	1							1		
Thiopentone plus relaxant and atropine	M	1							1		
	F										
Thiopentone plus relaxant, atropine and pethidine	M										
	F	1					1				
Thiopentone plus relaxant, atropine, hyoscine and papaveretum	M	1					1				
	F										
Thiopentone plus atropine	M	1					1				
	F										
Thiopentone plus inhalation	M	3			1			2			
	F										
Thiopentone plus inhalation and relaxant	M	2	1				1				
	F										
Thiopentone plus inhalation, relaxant and atropine	M										
	F	1					1				
Thiopentone plus inhalation, relaxant and pethidine	M	1			1						
	F										
Methohexitone plus relaxants	M	1					1				
	F										
Methohexitone plus inhalation	M										
	F	1						1			
Methohexitone plus inhalation and relaxants	M										
	F	1				1					
'General', unspecified	M	5					1	1	1	1	1
	F	2	1				1				
TOTALS	M	30	3	1	7	2	9	4	2	1	1
	F	21	3	2	3	3	5	2	2	1	

TABLE 2

Reasons stated for administering the anaesthetics listed in Table 1

Reason	*Number of patients*
Extraction of teeth	44
Extraction of roots of teeth or removal of impacted teeth ...	3
Conservation of teeth	1
'Dental operation' or 'dental treatment', unspecified	3
TOTAL	51

TABLE 3

Reports of deaths with mention of dental anaesthesia 1962—1965 inclusive. Number of deaths in hospital.

Year	*Total*	*In hospital*
1962	4	4
1963	11	7
1964	6	4
1965	4	2
	25	17

APPENDIX C

Numbers of claims for payment authorised in the general dental services of the National Health Service in England and Wales 1959-65 for general anaesthetics administered for extractions and other surgical treatment, including emergency treatment, and the proportion given by the operating dental surgeon.

(Estimated from samples of claims authorised by the Dental Estimates Board)

(a) Year	(b) Total no. of claims	(c) No. of claims for operator- administered general anaesthetics	(d) (c) as percentage of (b)
1959	1,832,050	586,700	32
1960	1,707,180	524,730	31
1961	1,566,750	438,060	28
1962	1,501,610	414,920	28
1963	1,439,330	374,830	26
1964	1,387,380	346,640	25
1965	1,322,980	319,240	24

APPENDIX D

Proportion of general anaesthetics administered in the general dental services of the National Health Service in England and Wales by medical practitioners with special training in anaesthesia.

TABLE 1

Proportion of general anaesthetics administered by medical and dental practitioners respectively (1)

Anaesthetist	Number of claims	Percentage of total claims
Total	6,754	100
By medical practitioner ..	3,012	44·6
By dental surgeon ..	3,742	55·4
(i) By operating dental surgeon ..	1,529	22·6
(ii) By second dental surgeon ..	2,213	32·8

(1) Obtained from a random sample of 6,754 claims involving general anaesthesia from those authorised for payment in the period November 1965 to January 1966 inclusive.

TABLE 2

Proportion of general anaesthetics administered by medical practitioners classified by practitioners' training in anaesthesia (1)

Type of anaesthetist	Anaesthetists		Anaesthetics given		Anaesthetics per doctor
	Number	Per cent.	Number	Per cent.	
Total ..	1,365	100	3,288	100	2·4
Consultant anaesthetists (2) ..	215	16	920	28	4·3
General practitioner anaesthetists (2) ..	132	9	598	15	4·5
Other doctors	1,018	75	1,770	57	1·7

(1) Obtained from all 3,288 claims for anaesthetics which were authorised for payment on 15th and 16th February, 1966.

(2) Doctors with special training in anaesthesia.

The following conclusions may be drawn by combining information from Tables 1 and 2:

(i) Proportion of general anaesthetics administered by medically-qualified practitioners (from Table 1)—45 per cent.

(ii) Proportion of medically-administered general anaesthetics administered by practitioners with special training in anaesthesia (from Table 2)—43 per cent.

Therefore

(iii) Proportion of general anaesthetics administered by medical practitioners with specia! training in anaesthesia—19 per cent.

These conclusions are incorporated in the diagram overleaf.

Notes: The following criteria were used in compiling Table 2:

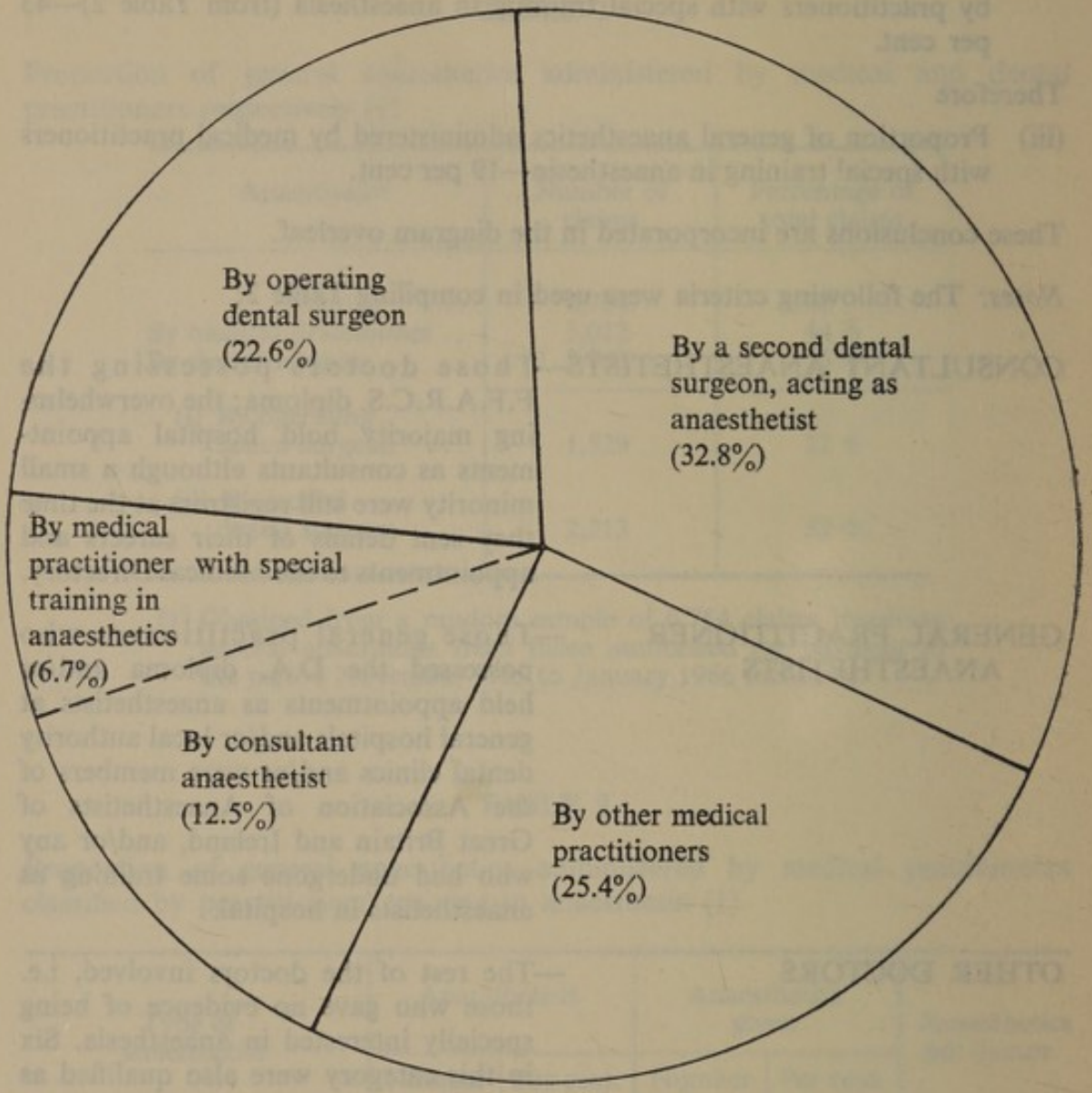
CONSULTANT ANAESTHETISTS—Those doctors possessing the F.F.A.R.C.S. diploma; the overwhelming majority hold hospital appointments as consultants although a small minority were still registrars at the time they sent details of their careers and appointments to the Medical Directory.

GENERAL PRACTITIONER ANAESTHETISTS—Those general practitioners who possessed the D.A. diploma and/or held appointments as anaesthetists at general hospitals and/or local authority dental clinics and/or were members of the Association of Anaesthetists of Great Britain and Ireland, and/or any who had undergone some training as anaesthetists in hospital.

OTHER DOCTORS—The rest of the doctors involved, i.e. those who gave no evidence of being specially interested in anaesthesia. Six in this category were also qualified as dental surgeons.

In all probability a few Senior Hospital Medical Officers were included in the first group and the rest in the second group, some of whom would have been later upgraded to consultant status. Hence in this survey the numbers of 'consultant anaesthetists' have probably been under-weighted and those of 'general practitioner anaesthetists' over-weighted.

Proportions of general anaesthetics in the general dental services of the National Health Service in England and Wales administered by dental practitioners and different categories of medical practitioner (see Tables 1 and 2).



APPENDIX E

Criteria for safety in dental anaesthesia

The following criteria are suggested for the safe administration of general anaesthesia in general dental practice. In general, these supplement the recommendations on safe practice in the main body of the report.

1. The selection of patients for general anaesthesia

During the routine assessment of the patient's fitness, mentioned in paragraph 6, the medical history may reveal the presence of diabetes, cardiovascular or pulmonary disease.

Where intravenous agents are used, patients who have a history of malaria often exhibit sensitivity and the dose must be reduced. Porphyria, which is common in South Africa but is occasionally encountered in this country, is an absolute contra-indication for intravenous barbiturates, as lower motor neurone paralysis can result.

It is important, too, in view of the increasing number of immigrants, that the possibility of sickle-cell anaemia in patients of African descent be kept in mind, since the avoidance of any oxygen deprivation is imperative in these cases.

Details of treatment past and present will reveal whether certain drugs are being or have recently been taken. The following are of particular importance in this connection.

(*a*) *Monoamine oxidase inhibitors*, of which the following are some of the common ones in use in this country.

Approved Name	*Proprietary Name*
Isocarboxazid	'Marplan'
Mebanazine	'Actomol'
Phenoxypropazine	'Drazine'
Pargyline	'Eutonyl'
Iproniazid	'Marsilid'
Phenelzine	'Nardil'
Nialamide	'Niamid'
Tranylcypromine	'Parnate'
Tranylcypromine and Trifluoperazine	'Parstelin'
Pivhydrazine	'Tersavid'

These drugs are widely used to counter depression. If they are taken within two weeks before the administration of a natural constituent of opium, e.g. morphine, an allied synthetic drug, e.g. pethidine, or a vasopressor drug, they produce in a small percentage of patients a profound sensitivity reaction, resulting in collapse and sometimes death. (The taking of these drugs is, therefore, a contra-indication to the use of techniques of sedation—paragraphs 23 and 24—which involve the administration of pethidine.)

(*b*) *Tranquillisers*
(*c*) *Hypnotics*, e.g. barbiturates
} Potentiate the action of intravenous anaesthetic agents.

(*d*) *Corticosteroids*
(*e*) *Hypotensive drugs*, e.g. hexamethonium
} Cardiovascular emergencies may occur during general anaesthesia in patients taking these drugs.

(*f*) *Anticoagulants*—The use of these drugs may indicate underlying cardiac ischaemia.

Liver disease and jaundice, severe anaemia, cachexia, adiposity, alcoholism and drug addiction modify the action of anaesthetic agents.

If any feature of the history warrants it, or in the event of any untoward occurrence during the treatment, the practitioner must always consult the patient's medical attendant.

2. Precautions in the surgery

(*a*) *Facilities for emergencies*

The safety of the patient demands that any surgery in which general anaesthetics are administered must be adequately equipped for dealing with emergencies. Although opinions may vary as to the extent or nature of such equipment, the following items are essential.

(i) Adequate suction apparatus, either foot- or power-operated.

(ii) Apparatus for the effective inflation of the lungs together with a selection of oral airways.

(iii) A fully adjustable chair in which the patient can be *quickly* moved into the horizontal position.

(iv) Surgical swab holders and tongue forceps.

Practitioners should be familiar with resuscitation methods, especially mouth-to-mouth breathing techniques and external cardiac massage and should ensure that they are practised in the routine to be followed if an emergency occurs.

Although various drugs, such as vasopressors, are sometimes used in resuscitation, they are of secondary importance in these emergencies and their use should normally be withheld in favour of urgent measures to restore the supply of oxygenated blood to the brain. The clearance of the mouth and throat by suction, followed by external cardiac massage with either the inflation of the lungs with air or oxygen or mouth-to-mouth breathing should be all that is required until the patient reaches hospital.

(*b*) *Other important facilities*

(i) A recovery room in which patients may be adequately supervised during the immediate post-operative period.

(ii) An autoclave or hot-air oven for the proper sterilisation of syringes and needles (unless the sterile disposable type is used) in order to avoid subjecting the patient to the risk of hepatitis.

(iii) Well-trained staff for supervising the recovery of patients, preparing and sterilising instruments, equipment and dressings and otherwise contributing to the welfare of patients. (Paragraph 28, however, advises against the use of such staff for helping with the actual administration of anaesthesia.)

3. Advice to the patient

Clear, printed pre- and post-anaesthetic instructions should be given to patients who have agreed to receive general anaesthesia. These should include the following details.

(*a*) *Before the anaesthetic*

(i) The patient must report details of any personal illness, weakness or known susceptibility and of any drug recently prescribed or being taken —especially sleeping drugs, tranquillisers or cortisone preparations.

(ii) The patient's stomach, bowels and bladder should be empty—no food should be taken within a period of at least 4 hours before the time of the appointment. Constrictive clothing or tight sleeves should not be worn.

(*b*) *After the anaesthetic*

(i) Arrangements must be made for a responsible person to accompany the patient home after a suitable period for recovery.

(ii) Patients accepting anaesthetic appointments must agree that they will not drive any vehicle or operate any machinery until the following day (see paragraph 20).

(iii) Alcoholic drinks of any kind should not be taken for several hours after the operation.

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