

## Office-based anaesthesia – an overview

S. M. BROKA

In the last few decades, office-based anaesthesia (OBA) has been widely developed and officially organized on the other side of the Atlantic.

This manuscript presents a summary of this evolution and a description of the current situation in the U.S.A. and in Belgium.

Then, a detailed report concerning a personal experience of OBA in Belgium is described.

Finally, guidelines are proposed for Belgian practice of OBA.

### Part one – History and current situation of office-based anaesthesia

#### DEFINITION

Office-based anaesthesia is ambulatory anaesthesia carried out by an anaesthesiologist in a physician's office.

This term covers not only practice of general or loco-regional anaesthesia but also sedation, analgesia and medical surveillance concomitant to therapeutic or diagnostic procedures, carried out in an office-based ambulatory setting.

#### HISTORY

The history of OBA is punctuated by developments in both ambulatory surgery and anaesthesia.

Ambulatory surgery has been the subject of numerous publications concerning large series of patients since the beginning of the 20<sup>th</sup> century. Take for example Nicoll, surgeon at the Glasgow Hospital for Sick Children, who reported a series of 9,000 patients undergoing ambulatory surgery, beginning in 1909 ! However it was not until the 1960's that ambulatory surgery began to be officially organized. The first course specifically designed to teach hospital-based ambulatory surgery was introduced in 1962 (University of California, Los Angeles) and the first ambulatory surgery hospital was created in 1969 (Reed & Ford, Phoenix, Arizona). Its development from then on was exponential and ambulatory surgery practices quickly

reached our continent with the success that can be observed today.

Office-based anaesthesia developed in a similar manner in the U.S.A., albeit slightly later. The Office Based Anesthesia Society was created in 1998 and the American Society of Anesthesiologists (ASA) clearly defined the standards for OBA when it published its guide of the same name in 1999. The updated version of these guidelines (October 27, 2004) can be viewed on-line on the ASA web-site (<http://www.asahq.org>). In May 2005, the College of Physicians of Quebec (*Collège des Médecins du Québec*) also published a guide laying out good practice for OBA and surgery (*Guide d'Exercice de la Chirurgie en Milieu Extra-Hospitalier*).

Subsequent publications concerning very large series of patients treated using OBA in the U.S.A. left no doubt as to the reality of the development, the degree of organization and the level of security of this type of exercise among Anglo-Saxon health practitioners.

For example, in 2001 HOEFFLIN *et al.* (1) reported the absence of significant complications in a series of 23,000 plastic surgery procedures carried out under general anesthetic using OBA. BITAR *et al.* (2) confirmed this observation in 2003, in a more modest series of 4,778 procedures of the same type carried out under sedation. In 2003, PERROTT D. H. *et al.* (3) also reported a series of 34,191 stomatological and maxillo-facial procedures, confirming the absence of specific complications while insisting on the high degree of patient satisfaction. More surprising was the study by VENKAT *et al.* (4) that, without being able to clearly explain it, reported the results of a survey of complications from ambulatory procedures carried out in Florida between 2000 and 2003 that found a reduction in the number of complications and

Serge M. BROKA, M.D.

Department of Anaesthesiology, Interventional Cardiology and Cardiac Surgery Unit, Hôpital Européen de Paris – La Roseraie, Aubervilliers, France.

Centre de Parodontologie Namurois, Erpent, Belgique.

E-mail: [broka@anesconsult.net](mailto:broka@anesconsult.net)



Fig. 1. — An office-based surgery center in USA

mortality of over 50% for procedures carried out in a physician's office compared with those in an ambulatory surgery hospital. Lastly, HANCOX *et al.* (5) showed that OBA was associated with a reduction in nosocomial infections. This list is far from being exhaustive.

Finally, from data published on-line by the ASA in 2005, we observe that approximately 10% of surgery procedures in the USA were then carried out in an office-based setting, corresponding to an annual total estimated at over 8 million procedures (Fig. 1).

In the same year, the guide of good practice for office-based surgery by the College of Physicians of Quebec noted that *“Taking into account the ongoing evolution in practices, it is difficult to determine the limits of surgery that can be carried out in an office-based environment (...). The only parameters that currently limit these procedures are the level of specialized technical capacity and the amount of time required for post-operative observation.”*

#### WHAT HAS CAUSED THIS EVOLUTION ?

While hospital-based ambulatory surgery has long since acquired a solid position in the health-care landscape, we can reasonably ask why there has been such a parallel development of OBA and office-based surgery.

There are a variety of arguments supporting the development of these practices.

The reduction of health costs associated with office-based surgery has frequently been proven. For example, already in 1994 SCHULTZ L. S. *et al.* (6) noted a reduction of over 65% in costs incurred for treatment of inguinal hernias and laparoscopic cholecystectomies when carried out in an office-based environment.

Also, practitioners who regularly carry out OBA often note an increase in demand by patients for this type of procedure, justified by improved comfort and personalized treatment. In general, office-based patients report a high level of satisfaction.

These same practitioners also unanimously appreciate the increase in their independence and benefit from simplified organization and scheduling, improved professional relations and a better quality of professional life.

At this point, it is important to underline that such an evolution has only been made possible due to impressive progress in the safety of anaesthesia, thanks to which mortality linked to ambulatory anaesthesia has been reduced by a factor of 40 over the last 20 years. For information, the ASA estimates current levels of mortality in ambulatory settings at 1/400,000 patients.

The reasons leading to this favorable evolution are numerous but it is clear that the efforts made in vocational training, the edition of guidelines by scientific societies, the generalization of monitoring techniques such as pulse oxymetry or capnography and the availability of new short acting drugs have all been decisive.

Finally, as underlined by BRADY *et al.* (7), recent developments in target controlled intravenous anaesthesia or sedation, which make it possible to maximize the use of these new drugs' characteristics, have no doubt contributed to improving safety and seem especially well adapted to OBA.

#### OFFICE-BASED ANAESTHESIA GUIDELINES

An analysis of the recommendations published by the ASA and the College of Physicians of Quebec concerning OBA is most instructive.

In general, far from leading to practices that could undermine the security of this specialty, these recommendations clearly demand a level of organization, logistics and medical capacities that are at least equivalent to those governing hospital-based practices.

More specifically concerning office-based practice, these recommendations highlight the importance of correct selection of patients who may be candidates for OBA, of patient discharge procedures as well as the organization of their return home, of training personnel for dealing with emergencies and of the necessity for agreements with a partner hospital to be in place as well as pre-established transfer procedures.

In summary therefore, the general guidelines comparable to those in hospital-based practice are respected and the requirements specific to office-based practice are clearly defined.

#### THE SITUATION IN BELGIUM

Office-based anaesthesia in Belgium is not regulated by any specific text.

Neither the Belgian Society for Anaesthesia and Resuscitation (*SBAR-BVAR*) nor the Belgian Professional Association of Anaesthesia and Resuscitation Specialists (*APSAR-BSAR*) have given an opinion concerning OBA as such.

Only two official opinions by the Belgian National Council of Physicians refer to it.

The first of these opinions is already dated. It appeared in the national circular of September 18 1976 : *“The location for general anaesthesia to be administered depends on the availability of qualified personnel and the necessary equipment to ensure that it is carried out correctly and that any complications can be dealt with (...). Deontologically, anaesthesia can take place outside a medical care centre provided that the above-mentioned requirements are respected (...). However it does seem preferable that anaesthesia be carried out in a medical institution, in the patient’s interest and for his/her security.”*

The second opinion, in the national circular dated November 14 1998, was replying to a question not directly related to OBA : *“The anaesthesiologist cannot accept to administer anaesthesia if all safety measures have not been taken, as much concerning the preparation of the patient as the presence of the necessary equipment and assistance”*.

Moreover, as far as finance is concerned, there is no official provision for the reimbursement of OBA. At the moment therefore, all the costs of practicing office-based anaesthesia (medical fees, personnel costs, recouping equipment investments, medical device vigilance, disposables, pharmaceuticals and medical gases, ...) are borne by the patient and any private medical insurance that he/she may have.

Finally, the position of insurance companies is fairly clear. According to the insurance companies questioned about it, and sometimes subject to a modification in the insurance premium, OBA is covered by their contracts insofar as all legal, deontological and professional obligations are respected (which today, as we have seen, is a less than a clear condition).

## Part two – Report of a personal experience of OBA

#### GENERAL POINTS

The experience described here concerns two years of experience in OBA carried out in a Belgian periodontology office. Periodontology is a specialization of dental medicine that deals with pathologies of adult gums. Briefly, the therapy generally proposed includes an initial aggressive phase of treatment aimed at interrupting the inflammatory processes, followed by a long-term maintenance phase. The initial phase of treatment is generally carried out over four sessions, consisting of a mechanical debridement of the inflamed tissues, or radicular surfacing, possibly completed by complementary surgical gestures like creation of gingival covering flaps. These types of treatment are generally carried out under traditional dental local anaesthesia.

The initial objective of this project was to propose sedation to patients undergoing the longest or most aggressive procedures, thereby making it possible for the whole first phase of treatment to be carried out in one session and in maximum comfort.

In the absence of specific Belgian recommendation in the matter, the Belgian Standards for Patient Safety in Anaesthesia and the ASA’s Guidelines for OBA were both taken into consideration.

#### SELECTION AND PRE-OPERATORY ORGANIZATION

Following the periodontology consultation, and according to the extent of the therapy being considered, the periodontologist selects eligible patients and informs them that it is possible to carry out their treatment in one session, under sedation. A video providing information about office-based sedation is then presented to the patients. If this option interests them, the patients are given a series of documents including general information about anaesthesia in a dental office, a traditional pre-operative medical questionnaire to be filled out, with the help of their general practitioner if necessary, and an informed consent form. An anaesthesia consultation is scheduled at that moment, well before the operation.

The anaesthesia consultations take place in the periodontologist’s office, which is equipped to carry out electrocardiograms, pulmonary function



Fig. 2. — Monitor defibrillator



Fig. 3. — Central oxygen distribution

screening test and to take blood samples. Following this consultation, or after further clarification when necessary, the feasibility of sedation is validated by the anaesthesiologist and the date for the procedure is confirmed. Patients then leave the centre with written pre-operative instructions and a prescription for post-operative analgesics that they may then procure before their operation.

On the day of the operation, patients come fasted to the office accompanied by a relative. Once they are prepared (gown and cap, buccal disinfection), they are settled in a traditional dental chair and monitored.

#### OFFICE EQUIPMENT

For monitoring purposes, a Zoll M-series CCT monitor defibrillator (Zoll Medical Corporation,



Fig. 4. — Respirator

USA) was chosen (Fig. 2). It incorporates functions of a 3 to 12 leads electrocardiogram, a pulse oxymeter, a capnograph, invasive and non-invasive arterial blood pressure measurement, a manual or semi-automatic biphasic defibrillator and a transcutaneous pacemaker. A glucose analyser and, at ends of redundancy, a portable pulse oxymeter and manual tensiometer are also available.

Oxygen distribution is centralized with a wall outlet in all treatment rooms (Fig. 3). A portable back-up oxygen supply is also available.

Although almost all procedures are carried out in spontaneous ventilation, the office is equipped with a Dräger (Dräger Medical, Germany) Oxylog 3000 respirator (Fig. 4). The choice of this respirator, functioning exclusively in open circuit, implies that halogenates or nitrous oxide will not be used in the center. On the other hand, this respirator is very well adapted to situations requiring any respiratory assistance (VACI, BIPAP, VS/PEEP) that may be needed during sedation. Moreover, a manual ventilation bag is available in all treatment rooms.

In addition to the traditional dental suctions, an additional suction is dedicated for anaesthesia purposes.

Emergency lighting is accessible in all treatment rooms.

All the equipment described here is portable with an autonomous power supply, simplifying any patient transfer requiring medical support.

All medical and anesthetic emergencies can be dealt with using the office dispensary supplies.

All medical files (consultation report, anaesthesia forms, complementary exams...) are computerized.



Fig. 5. — Sedation with combined target-controlled infusion of propofol and remifentanyl.



Fig. 6. — Continuous bispectral index monitoring

#### ANAESTHESIA PROTOCOL

The anaesthesiologist is systematically assisted by an operating room nurse.

The patients are not pre-medicated, with the exception of an ibuprofen pill if there is no contraindication.

Sedation is exclusively intravenous and is based on a combined target-controlled infusion of propofol and remifentanyl, at the average flows of 1.2  $\mu\text{g/ml}$  and 1.5  $\text{ng/ml}$  respectively (Fig. 5). The depth of sedation is continuously monitored by bispectral index (Aspect Medical System Intl. B.V., The Netherlands) (Fig. 6).

Additional oxygen is systematically administered through nasal prongs.

Post-operative analgesia is based on oral administration of paracetamol and ibuprofen, if there is no contraindication.



Fig. 7. — A periodontic procedure under office-based anaesthesia.

#### OPERATIVE PROCEDURE

Once sedation is achieved, the procedure begins with local infiltrations of mepivacaine with adrenalin, used both for complementary analgesia and hemostasis. Throughout the procedure the depth of sedation is continuously adapted to the circumstances. The procedures cause no, or few, hemorrhages. Nonetheless, a dental assistant is specifically charged with endo-buccal suction (Fig. 7).

At the end of the procedure, the patient is left in the chair until a return to a calculated cerebral concentration of propofol and remifentanyl lower or equal to 0.5  $\mu\text{g/ml}$  and 0.5  $\text{ng/ml}$  respectively is achieved. During this period, any additional analgesia is provided by intravenous propacetamol or sublingual paracetamol.

#### POST-OPERATIVE PERIOD

The patient is then progressively stood up, dressed and asked to stay for at least 1 hour in a waiting room with continuous oxymetric monitoring and accompanied by a nurse.

Patient discharge is permitted with the written anaesthesiologist's authorization.

Table 1  
Demographic data

n	108
F / M	67 / 33 %
ASA 1 / 2	74 / 26 %
Age	46,3 ± 9 yrs
Body mass index	24.7 ± 3.3
Procedure duration	77 ± 22 mins

The patient is accompanied out of the office by a relative, after having received the usual recommendations and written post-operative prescriptions (analgesics, antibiotics if needed, possible modifications of treatments...) and a satisfaction survey to be returned to the office.

A mobile phone number, accessible 24 hrs a day, is given to the patient for any questions following the operation. The patient is systematically contacted by phone on the day after the operation.

## RESULTS

The first two years of activity (October 2004-October 2006) are summarized in Table 1.

After analysis, it was observed that 53% of patients lived in a different province to the physician's office, including 4% from abroad. It is probable that this fact influenced their choice to benefit from all the treatment in one session, thereby leading them to choose a procedure under sedation.

No anaesthesia complications were recorded during this first series.

Ventilation was temporarily assisted in 6 cases (5.6%), including 3 using a laryngeal mask airway.

The answers to the satisfaction survey are given in Table 2. Sixty-seven percents of surveys distributed were completed and returned to the office.

The patients answered each question using a grade of 1 to 5 (1 = minimum satisfaction ; 5 = maximum satisfaction). Table 2 shows the answers to the survey, expressed in %.

Several other observations can be made based on this experience.

Voluntarily, and quite understandably, the selection was limited to ASA 1-2 patients. Consequently, it is obvious that the most critical patients requiring periodontological treatment (obese, diabetic, hypertensive, stented patients taking antiaggregants, ...) were left alone with the periodontologist for their procedure when those are precisely the type of patients who could poten-

tially benefit the most from any form of increased care (medicalization, monitoring, ...). As a result of this observation, such patients are now given the possibility of scheduling their treatment, independently of any anaesthesia procedure, at times when the anaesthesiologist is present in the office.

Moreover, a new population of patients has emerged, coming to this periodontology center for the precise reason that they wish to have sedation during their treatment. This observation concurs with the Anglo-Saxon experience, which clearly showed existing patient demand for this type of care.

## CONCLUSION

Office-based anaesthesia is now well developed and organized in the U.S.A., in particular in response to the increasing demand by patients for this type of care and the constant need to reduce health care costs. This evolution has no doubt been facilitated by the spectacular improvements in the safety of ambulatory anaesthesia over the last few decades.

The experience described here, although quantitatively modest, aims to encourage further thought in the matter, within our universities and professional associations, and to foster awareness of the need for specific guidelines to be edited for this type of practice.

In any case, when we consider the fact that office-based sedation is routinely and openly carried out in our country (intravenous sedation by the gastroenterologist, nitrous oxide administered by the dentist, ...) and is practiced in conditions that are systematically not in line with our anaesthesia standards, the creation of such guidelines is probably a suitably adapted response to any potential drifts.

## Part three – A proposal for OBA guidelines

*“It must be continuously emphasized that the standard of care in an office surgical suite should be no less than that of a hospital or an ambulatory surgical unit” (ASA Task Force on OBA, 2002)*

## GENERAL POINTS

The physician's office where office-based ambulatory anaesthesia is carried out must name a

Table 2  
Satisfaction survey

	1	2	3	4	5
<b>Anaesthesia consultation</b>					
Did the anaesthesia consultation seem useful to you ?	0	4	15	19	62
Were you satisfied with the information you received concerning the anaesthesia ?	0	0	4	19	77
Did your appointment start on time ?	0	1	1	15	83
<b>Day of the operation</b>					
Was reception at the center satisfactory ?	0	0	1	13	86
Did your appointment start on time ?	0	0	0	13	87
Was the sedation satisfactory ?	0	0	0	7	93
Did you feel pain during the procedure ?	0	0	0	10	90
Did you feel nauseous during the procedure ?	0	0	0	0	100
<b>Post-operative period</b>					
Did you feel pain after the procedure ?	1	0	16	26	57
Were you nauseous after the procedure ?	0	0	6	6	88
Did you receive sufficient support after the procedure ?	0	1	1	16	82
What is your overall level of satisfaction ?	0	0	0	14	86
Would you be ready to undergo this type of procedure again in the same conditions ?	0	0	0	10	90

medical administrator to coordinate the office's activity and manage its material resources, including pharmaceuticals, medical gas distribution, sterilization and electrical supply and security.

At all times, the medical administrator must ensure that the resources in the physician's office are adequate in relation to the status of the patient being treated (age, medical, psychological and social profile) and the type of procedure being carried out.

The medical administrator is responsible for ensuring that all personnel in the physician's office have the appropriate diplomas, experience and skills required to carry out office-based ambulatory anaesthesia.

Most particularly, all personnel must be trained in basic resuscitation techniques, plus a doctor or paramedic trained in advanced resuscitation techniques must be present beside the anaesthesiologist from the beginning of the procedure until the patient returns home.

A document should be written (and updated annually) to define the organization of the physician's office and its personnel. In particular, this document should define the protocols to follow in the case of emergencies as cardio-pulmonary support or accident involving a fire.

The physician's office where office-based ambulatory anaesthesia is carried out should also possess a written protocol covering the modalities for patient transfer to an alternative hospital to continue patient care when a patient's condition requires it or when the length or nature of the post-

operative care unforeseeably exceeds the office resources.

The medical administrator is responsible for ensuring that the Belgian law for patient rights (dated August 22, 2002), as well as the Belgian legislation concerning electrical risk, fire prevention, access for limited mobility patients, medical waste disposal and drug storage are respected.

When no medical administrator has been named, the responsibility for following the above recommendations falls to the anaesthesiologist practicing in the physician's office.

#### MATERIAL RESOURCES

*The material resources, personnel and general logistics in the physician's office where office-based ambulatory anaesthesia is carried out must respect the standards laid out in the Belgian Standards for Patient Safety in Anaesthesia, dated February 27, 1999.*

The particularities of carrying out anaesthesia in a physician's office may lead to some modifications to this text. There will be :

- no biomedical staff if equipment maintenance is carried out by external services, in accordance with the manufacturer's recommendations. In foresight of equipment failure, substitute equipment must be available to allow procedures to be completed ;

- no monitoring for halogenates, if they are not used ;
- no oxygen analyzer, if nitrous oxide is not used ;
- no means to treat malignant hyperthermia , if no agent able to induce it is used ;
- no on-site equipment to carry out blood tests if, alternatively, there is a written protocol describing the procedure for transferring samples to an external medical laboratory and for collecting the results within a reasonable delay, during the physician's office opening hours ;
- existence of an internal communication system, adapted to the physician's office, enabling instant and direct contact between the various staff members involved in each area where a patient is being cared for ;

## PROCEDURES

The anaesthesiologist carrying out anaesthesia in a physician's office plays an active role in defining the surgery scheduling.

At all times during the patient's care, the anaesthesiologist responsible for him/her verifies that the planned procedure is adapted to the patient's clinical status and to the resources available in the physician's office, as well as confirming the feasibility of a carrying out the procedure using office-based ambulatory anaesthesia.

*The anaesthesiologist carrying out anaesthesia in a physician's office must respect the standards laid out in the Belgian Standards for Patient Safety in Anaesthesia, dated February 27, 1999, including the nuances listed above.*

The anaesthesiologist must be physically present throughout the operation and immediately available until the end of the post-anesthetic surveillance period.

Additionally, a doctor or paramedic trained in advanced resuscitation techniques must be present until the patient returns home.

The decision to let the patient return home is a medical responsibility and must be noted in the medical record.

The details concerning the patient's return home and the accompanying measures concerning him/her must be adapted to the patient's individual case and to the type of procedure carried out, and they must be noted in the medical record.

The patient must have the possibility to make contact with the medical staff 24 hrs/day throughout the post-operative period.

## References

1. Hoefflin S. M., Bornstein J. B., Gordon M., *General anaesthesia in an office-based plastic surgical facility : a report on more than 23,000 consecutive office-based procedures under general anaesthesia with no significant anesthetic complications*, PLASTIC RECONSTR. SURG., **107** : 243-51, 2001 (Jan).
2. Bitar G., Mullis W., Jacobs W., *et al.*, *Safety and efficacy of office-based surgery with monitored anaesthesia care/sedation in 4778 consecutive plastic surgery procedures*, PLASTIC RECONSTR. SURG., **111** (1) : 150-8, 2003.
3. Perrott D. H., Yuen J. P., Andressen R. V., Dodson T. B. *Office-based ambulatory anaesthesia : Outcomes of clinical practice of oral and maxillofacial surgeons*. ORAL MAXILLOFAC. SURG., **61** : 983-95, 2003 (Sept).
4. Venkat A. P., Coldiron B., Balkrishnan R., *et al.*, *Lower adverse event and mortality rates in physician offices compared with ambulatory surgery centers : a reappraisal of Florida adverse event data*, DERMATOL. SURG., **30** (11) : 1444-53, 2004.
5. Hancox J. G., Venkat A. P., Hill A., *et al.*, *Why are there differences in the perceived safety of office-based surgery ?*, DERMATOL. SURG., **30** (11) : 1377-79, 2004.
6. Schultz L. S., *Cost analysis of office surgery clinic with comparison to hospital outpatient facilities for laparoscopic procedures*, INT. SURG., **79** : 273-277, 1994.
7. Brady W. J., Meenan D. R., Shankar T. R., *et al.*, *Use of a remifentanyl and propofol combination in outpatients to facilitate rapid discharge home*, AANA J., **73** (3) : 207-10, 2005.