

EDITORIAL

Procedure coding in anaesthesia

Introduction

Procedure coding in anaesthesia has taken great steps forward over the last decade, alongside the increased use of computers in medicine. Anaesthesia lagged behind other medical specialities in developing coding systems in the 1980s, and very little information about the activities of anaesthetists was collected. Large and detailed coding systems for medicine have now been developed, and anaesthesia is included within these. We can now examine the uses of coding in anaesthesia, the way that coding systems work, and question whether procedure coding is a benefit or a hindrance to anaesthetists.

What is coding?

There is some confusion about coding, and what it entails to anaesthetists. Coding is a means of assigning some identifying label, usually in the form of letters and numbers (alphanumeric coding). To give an example of an anaesthetic procedure being coded, the *insertion of an endotracheal tube* may be given the code ABC123. This coding does not alter the actual procedure, nor define it: it merely converts the words into another form.

Coding has the advantage that one code can provide a focus for the many different ways that can be used for describing the same procedure. To use the above example, the procedure of endotracheal intubation can be written as follows:

- Endotracheal intubation performed;
- Tracheal intubation performed.
- Tracheal (or endotracheal) tube placed;
- Patient intubated, etc.

Because they all mean the same, and can all be used to record the procedure, they can all be described by the code ABC123. This can simplify analysis: if an audit of how many patients have been intubated is carried out, the number of procedures coded ABC123 is counted, rather than having to look for how many endotracheal intubations, tracheal intubations, tracheal

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tubes placements, etc. have been performed. Providing there are correct links back and forth between the procedure being described and the code, information is not lost by coding.

It may ease analysis if procedures are grouped together for example as airway procedures (to include procedures such as tracheal intubation, insertion of a laryngeal mask airway, or a tracheostomy). These grouping terms can also be coded.

What are the uses of coding systems?

There are a number of reasons why coding is useful.

(a) Ease of handling of information, especially in electronic formats [1]: computers can handle short strings of numbers or letters more efficiently than long strings of words. The computer processes the information by converting the procedure term into a code, storing the code, retrieving of the code, and re-converting the code into recognizable information. The use of computers in medicine which are able to handle information such as this is becoming more and more widespread, and almost universal in some areas.

(b) Audit of information: this can be done at national or local level. Many departments of anaesthesia have developed their own coding systems to ease review of the work done in the department. At national level, coded information is used for central statistical returns, such as the Office of Population Censuses and Surveys Classification of Surgical Operations and Procedures (OPCS-4) [2] in the United Kingdom.

(c) Standardization of terminology: the creation of lists of coded terms leads to a standardization of recording. This standardization greatly enhances communication not only within a hospital but also between other hospitals [3]. A universally recognized coding system, therefore allows more efficient transfer of information between health care professionals. As it is envisaged that this transfer of information will increasingly be electronic in nature, computerized systems will rely on codes to communicate.

(d) Use in electronic patient records/anaesthetic records: there has been much effort put into the development of terms, which can then be coded. These terms can be used as part of the medical record, recorded in electronic format. It is in this area that most work has been done with respect to coding of anaesthetic procedures, so that the details of an anaesthetic can be part of the electronic patient record. Large collections or thesauri of terms and codes have been created, and some of these will be reviewed later. This is a complex area, and has resulted in a tremendous expansion in the depth and detail of procedure coding in anaesthesia.

(e) Analysis of information for costing: the American Medical Association, in the form of its Current Procedural Terminology [4] has, since 1966, produced lists of descriptive terms, with accompanying codes that are used to describe medical procedures. These codes are then used by health insurers for costing of procedures.

It should be noted that although a coding system may have been designed for one particular purpose, it may be used for other purposes, e.g. health insurance claims.

Procedure coding in anaesthesia

It is now necessary to examine how anaesthetic procedures can be recorded and coded.

The administration of an anaesthetic involves many different procedures. We record many of these procedures, some in short hand form as part of the anaesthetic record. Some procedures are rarely written down, but there may be occasions, for example if there has been a complication or critical incident, when a more comprehensive record may be required. A collection of terms needs, therefore, to be as complete as possible. It is not just detailed procedure terms that are needed; sometimes more generic terms will be necessary, such as general anaesthesia, local anaesthesia or sedation.

The categories of procedures that are commonly encountered are as follows:

- Administration of a general anaesthetic (to allow terms such as induction of anaesthesia, or inhalational induction);
- Procedures involving airway control or manipulation (terms such as endotracheal intubation);

- Administration of drugs, intravenous fluids;
- Procedures involving cannulation of blood vessels;
- Procedures involving local or regional anaesthesia;
- Procedures for the relief of pain;
- Procedures involving the safety and positioning of a patient under anaesthesia;
- Procedures involving the control of ventilation of a patient;
- Procedures relating to monitoring;
- Procedures relating to the measurement of variables and parameters;

Many of these procedures are not exclusive to anaesthesia; non-anaesthetists may find these coded procedure terms useful.

How much information should a procedure term contain?

To some extent, this will depend upon the use to which the procedure terms will be put. For example, if the procedure code is to be used for costing only, then it is unlikely to matter whether a brachial plexus block is performed via the axillary or interscalene approaches, or whether a 2.5 or 5 cm needle was used. This degree of detail will be necessary, however, for a record of anaesthesia. A collection of procedure terms needs, therefore, to have some variation in the complexity of terms, to allow flexibility of use. Similarly, given all the variations in technique that can exist in performing anaesthetic procedures, a separate procedure term to describe each one may make the resulting collection of procedure codes too big and difficult to use. The ability to create a system of procedure terms that contain basic information, but then can have additional information attached is of benefit. Using the example of an insertion of a brachial plexus block again, we can have the following system:

- Basic procedure: brachial plexus block;
- Approach: axillary;
- Equipment: nerve stimulator, insulated needle;
- Laterality: right;
- State of patient: awake.

The anaesthetist can add as much information as he or she wants. Fortunately, computer software can be designed to handle such complexity. Conversely, it is important that the terms used to describe procedures do not become too narrow, or else anaesthetists will not use the terms, fearing loss of detail.

The ability to cope with common synonyms (such as endotracheal intubation/tracheal intubation) is of great benefit. The synonyms all relate to the same concept, so they only need one procedure code. The use of synonyms, and also common abbreviations will increase the compliance with a coding/termining system.

How developed is procedure coding in anaesthesia?

Historically, anaesthesia has lagged behind other medical specialities in the development of coding systems. For example, coding for anaesthesia has often been in the form of 'Anaesthesia for surgical procedure A or B, etc'. Since the development of the automated anaesthesia record and the realization that computers can be used as powerful audit and management tools, there has been a demand for a coding system that relates specifically to anaesthesia. As a result, most of the terms that have been developed have been designed for use in electronic record-keeping systems.

Initially, individual departments started to write their own coding systems, but there have now been developed a number of major international thesauri of terms. There are two large collections of terms designed to support electronic patient records. These are SNOMED, produced by the American College of Pathologists [5], and the Clinical Terms Version 3 (CTV3) (formerly known as Read Codes) [6], produced by the National Health Service Executive in the UK. They are both written in English, although translations are also being developed. In addition, the US National Library of Medicine has created a metathesaurus of medical terms and codes from around the world, and SNOMED and CTV3 are included; this is the Universal Medical Language System (UMLS) [7]. However, as a metathesaurus, it does not represent a discreet working system of terms and codes in the same way as SNOMED and CTV3.

Both SNOMED and CTV3 build up terms in hierarchies, and this provides a framework for the coding process. For example in CTV3, the term *tracheal intubation* is derived as follows:

- Operations and procedures;
- Respiratory tract procedures;
- Airway procedure;
- Tracheal intubation.

It is important to note that the user of terms and codes need not necessarily know the details of these hierarchies, nor the codes in order to use them: the anaesthetist will choose a term to use, and the computer system will handle the manipulation of codes.

The anaesthetist may need to record more than the fact that a tracheal tube was inserted. Other details, for example, that might be required include: the size of tube; the route of insertion; the degree of difficulty; the equipment used, such as a bougie, or fiberoptic device; and any complications that might arise. This extra information, sometimes referred to as qualifying information, will also need to carry codes. Thus, when a procedure is recorded in an electronic record, there may actually be a string of codes, linked together, to describe the one procedure.

SNOMED and CTV3 are collections of terms designed for use by all medical specialities. This is of great advantage to the anaesthetist, as this allows anaesthetists to use procedure terms which maybe considered primarily the concern of other specialities, e.g. urinary catheter inserted, and vice versa.

Conclusions and plans for future work

Having been developed, the coding system needs to be introduced. For all the work done in the area of coding in medicine, and anaesthesia in particular, the question must be asked, will it make a difference to the 'working anaesthetist', and will that difference be a positive one?

To ensure that clinicians use a coding system, the system must be acceptable to those who will be using it. This will depend upon the perceived benefits, and on the ease of use. The benefits will be clear once the codes have been employed for some of the uses outlined above. The ease of use depends upon the following:

- (a) The quality of the terms presented to the anaesthetist. Terms will be easier to use if they are clear, use the locally accepted spelling (*anaesthesia/anaesthesia*), and have synonyms available (e.g. *tracheal/endo-tracheal*).
- (b) The design of the computer system and software which presents the coded terms to the anaesthetist. This is vitally important to the success of an electronic record keeping system, for if they are poorly presented

however well-written and designed, no one will use them.

(c) The programme of education used to introduce the computerized coding system.

Only when these matters are addressed, will coding for anaesthesia records become accepted, as many anaesthetists are worried that computerization of their records will create extra work, and distract their attention from their patient.

No one thesaurus is comprehensive [8], although the American College of Pathologists and the NHS Executive have announced plans to combine SNOMED and CTV3 [9], in order to improve the breadth and depth of the terms available for coding. It is hoped that this collaboration will provide the most comprehensive collection of terms necessary for the creation of electronic patient records.

Health care providers, such as the NHS in the UK, have committed themselves to the use of electronic records, and anaesthetists will need to have a means of recording the procedures they perform. Much work has been done to provide procedure codes, although refinement of this work is ongoing. This work, allied to the continuing development of sophisticated computer programs means that there will be great changes in the ways that anaesthetists can record their work.

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