Diversity in preoperative-Assessment Data Collection, a Literature Review

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Abstract: The appropriate anesthetic techniques and care during and after operation rely on data gathered during the preoperative assessment. Because various people are involved, standardization of this process is important. This paper provides a systematic literature review about which data items are collected in the preoperative assessment. Thirty-two relevant articles were found by PubMed search. To categorize data SNOMED CT concepts are used, resulting in 13 categories totaling 540 data items. The two largest categories of data were “past history of clinical finding”, and “physical examination procedure” with 251 and 75 data items respectively. Our study showed a high diversity of data items in the preoperative assessment. Because of the diversity of patients and treatment options available one undisputed preoperative assessment data set is hard to define. However, to solve the problem of exchangeability of the information at least anesthesiologists should use a same core set of data.

Key words: data set, standard, preoperative assessment, anesthesiology

Introduction

The rapidly changing health care environment requires appropriate, accurate and timely data to enhance communication between healthcare providers. It is important to collect data in a structured and standardized way to increase quality of data documentation. In the multidisciplinary setting of preoperative assessment standardization of the data is essential to facilitate effective communication between healthcare providers.

A proper preoperative assessment contributes to the reduction of postoperative incidents. Studies of perioperative morbidity and mortality repeatedly show that preoperative patients’ conditions are significant predictors of intraoperative and postoperative morbidity and mortality[1,2]. The purposes of preoperative assessment are to estimate and reduce the mortality and morbidity risks associated with surgery, to determine required anaesthesia and equipment during the operation based on the patient’s condition, to increase quality of care, to inform the patient about anaesthesia, and to obtain informed consent[3,4].

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In the past, the anaesthesiologist reviewed his or her own patients the night before surgery. Nowadays, this assessment is often done in preoperative clinics some days or weeks before surgery, in collaboration with other professionals such as specialized nurses. This new approach reduces the number of cancelled procedures. However, as the assessment is not necessarily performed by the anaesthesiologist who will actually administer anaesthesia, it reduces contact between care provider and patient. Consequently, this requires an increase in reliance on information that is obtained during the preoperative assessment: one should have detailed and ‘objective’ information right before the operation without performing part or all of a preoperative assessment again. Exchangeability of the information between different users and even different systems becomes increasingly important. Making use of existing standards such as terminological systems and reference information models contributes to this.

A preoperative assessment relies on collected information regarding a patient’s past history, physical examination, and clinical tests. Although the objective and the general domain of information in preoperative assessment are nearly the same in all settings, (the level of detail of) the information collected, however, remains unclear[3]. According to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) standards[5], all surgical patients are required to have a history and physical examination documented in the patient record before surgery, but the components of data for those are not specified.

We performed a systematic literature review, with the main objective to identify data collected in the preoperative assessment and to investigate the degree of interdisciplinarity. This review functions as a first step towards determining which data items should be collected in the preoperative assessment. Its purpose is to provide a basis for designing a national core dataset for preoperative assessment in the Netherland. This study is part of a larger effort to come to a standardized perioperative data set, which is performed in collaboration with the International Organization for Terminology in Anesthesia (IOTA).

1. Method

In order to find all articles in the last 10 years describing preoperative assessment datasets we used the PubMed database (January 1997 to June 2007). Only English language articles were included which fulfilled the search terms described in table 1. We used four sets of relevant key words and MeSH terms. Set 1 includes terms related to preoperative care, set 2 indicates assessment-related terms, and set 3 refers to possible ways or sources for data collection in preoperative assessment. Set 4 contains terms like “anaesthesia” or “preoperative” in the title of the article. We combined search terms using “OR” within the sets and “AND” among them. To check the recall of the search strategy we compared the search results with three relevant articles[5-7] and the references of a review article[3].

Two reviewers (LA and NdK) independently judged all titles and abstracts. Disagreements were discussed with a third reviewer (RC) and the final decision reflected consensus of all three reviewers. Articles were selected based on the following inclusion and exclusion criteria.

Editorials as well as original studies were included if they focused on collecting data in normal pre-anesthesia cases, or if they described preoperative data in one or more general categories of diseases, such as cardiac surgery. We excluded all articles
that described data collection for children, for patients with a specific disease or operation, and articles about patients at risk for specific complications. All articles focusing on predictors or risk factors of postoperative complications are excluded except those which explicitly mentioned that data about predictors or risk factors are commonly collected in preoperative assessment. Evaluation studies on necessity of specific tests, or specific parts of physical examination, and impact of different treatments or methods on risk factors, mortality, and morbidity were excluded. Studies were excluded that focused on organization of the preoperative clinic; time and cost management of operation room and the clinic; unless they described the data components. Systematic reviews, commentaries, and letters were excluded.

We extracted all data items part of the preoperative assessment described in the selected articles. As most of the articles had different ways for categorizing data we used SNOMED CT concepts to categorize the data.

To investigate the degree of interdisciplinarity, data about time between preoperative assessment and operation; disciplines involved in the preoperative process; and location for collecting data are extracted from each included article.

2. Results

In total we found 450 articles of which 63 articles were selected based on titles and abstracts. Based on the full-text review, 32 articles met our inclusion criteria. Preoperative assessment was performed between 30 days before surgery and the day of surgery, most of the studies stated one or more days before the surgery. Anesthesiologists, nurses, and other professionals such as surgeons, and consultants were involved in the preoperative assessment (figure 1). Three articles reported that the assessment forms should first be completed by the patient. In 47% of cases preoperative assessment was done in an outpatient clinic, 19% in hospitals and in 34% of cases the location was unknown.

We extracted 540 data items from the articles and used 13 categories to classify these data. Table 2 shows per main category, the number of articles mentioning this main category, or at least one of its data items, and the number of that described data collection for children, for patients with a specific disease or operation, and articles about patients at risk for specific complications. All articles focusing on predictors or risk factors of postoperative complications are excluded except those which explicitly mentioned that data about predictors or risk factors are commonly collected in preoperative assessment. Evaluation studies on necessity of specific tests, or specific parts of physical examination, and impact of different treatments or methods on risk factors, mortality, and morbidity were excluded. Studies were excluded that focused on organization of the preoperative clinic; time and cost management of operation room and the clinic; unless they described the data components. Systematic reviews, commentaries, and letters were excluded.

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![Figure 1: disciplines involved in preoperative assessment](image-url)
Table 2: Frequency of collected data items per category extracted from literature

<table>
<thead>
<tr>
<th>Category</th>
<th>Nr. of articles [references]</th>
<th>Nr. of data items in category</th>
<th>Data items, top 3 occurrence (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic history detail</td>
<td>26[2,6,8-31]</td>
<td>11</td>
<td>Age (24) Sex (13) Weight/BMI (11)</td>
</tr>
<tr>
<td>Past history of clinical finding</td>
<td>31[2,5,6,8-35]</td>
<td>213</td>
<td>Diabetes (21) Cardiovascular diseases (21) Liver diseases (17)</td>
</tr>
<tr>
<td>Functional finding</td>
<td>16[2,5,6,9-12,18,19,24,25,27-30,35]</td>
<td>13</td>
<td>Exercise tolerance (9) Functional capacity (8) Prosthesis (5)</td>
</tr>
<tr>
<td>Behaviour finding</td>
<td>18[2,5,6,8-13,18,19,21,23,25,28-31]</td>
<td>4</td>
<td>Cigarette smoking and use of tobacco (16) Alcohol drinking (15) Illicit drugs (8)</td>
</tr>
<tr>
<td>Family history</td>
<td>13[2,5,6,9-11,14,18,25,28-30,35]</td>
<td>8</td>
<td>Anaesthesia-related problems (9) Malignant hyperthermia (4) Bleeding disorders (2)</td>
</tr>
<tr>
<td>Patient status observation</td>
<td>19[2,5,6,8,9,12,15-17,19,21,23,25,27-31]</td>
<td>27</td>
<td>Pregnancy (9) Informed consent (8) Comorbidities (7)</td>
</tr>
<tr>
<td>Review of medication</td>
<td>24[2,5,6,8,12-14-16,18-21,23-31]</td>
<td>68</td>
<td>Anticoagulant medications (15) Aspirin-containing medications (12) Diuretics (10)</td>
</tr>
<tr>
<td>Physical examination procedure</td>
<td>27[2,5,8-19,21,22,24-34]</td>
<td>75</td>
<td>Cardiovascular examinations (13) Blood pressure (11) Respiratory examinations (10)</td>
</tr>
<tr>
<td>Laboratory test</td>
<td>28[2,5,6,8-22,24,26,28-34,36]</td>
<td>53</td>
<td>Glucose (17) CBC (16) PT, PTT (15)</td>
</tr>
<tr>
<td>Procedure</td>
<td>24[2,5,6,9,11-16,18-21,23-31,35]</td>
<td>11</td>
<td>Planned operation (13) Diagnoses (8) NPO status and type of anaesthesia (7)</td>
</tr>
<tr>
<td>Preoperative evaluation, anaesthesia</td>
<td>26[2,5,6,8-19,21-25,27-31,35]</td>
<td>31</td>
<td>Airway examinations (12) ASA class (11) Obesity, and anaesthesia complications history (10)</td>
</tr>
<tr>
<td>Administrative information</td>
<td>10[2,9,12,13,18,19,27-30]</td>
<td>15</td>
<td>Family or other support after surgery and during hospitalization (6) Information about how to contact with patient’s family after surgery (4) Accompanying person, date of assessment, and transfer from (2)</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>540</td>
<td></td>
</tr>
</tbody>
</table>

data items. The right column shows the 3 most frequently used data items within a category.

3. Discussion and conclusion

This review showed a large diversity of data elements in preoperative assessment. Whereas each healthcare setting focuses on a limited set of data in preoperative assessment, we retrieved 540 data items in 13 categories. The categories “past history of clinical finding”, “physical examination procedure”, and “review of medication”
contained the largest number of data items. The observed interdisciplinarity (figure 1) and time delay (up to 30 days) between preoperative assessment and the operation emphasize the need for standardization of pre-operative data collection.

There are two limitations in our study. First, we may have missed some studies, because of the existing limitations in MeSH terms and lack of consideration of more relevant key words. We used the keywords of Van Klei’s article[3] as a basis in our search strategy and expanded them to 4 sets of keywords (table 1). Given the extensive search strategy it is likely that most relevant articles were found. Furthermore inclusion of more papers will most likely merely strengthen the conclusion that there is a large diversity in preoperative assessment data collection. Second, studies that described general data for specific cases could have been missed, because we only addressed studies about normal pre-anesthesia cases, and cases regarding general categories of diseases.

The diversity of data collected by this review showed that almost each setting collected its own data set. Such diversity may also exist in other clinical settings. Designing a standard data set is necessary to overcome the dispersion of data among different settings. Although it is difficult to introduce an undisputed data set for the preoperative assessment, interoperability requires a standard core data set. It would facilitate patient referrals across health care settings, and help healthcare providers to have a same understanding of patients’ conditions. This would increase the quality of care. Based on their clinical needs institutions could add more data to the core data set. To facilitate the exchangeability of data and effective communication among health care providers, we recommend using standard terminological systems and information models such as SNOMED CT and LOINC to give value to the data items.

This study demonstrated the diversity in collected pre-operative assessment data and revealed the most frequently used data elements and the core categories of preoperative data. The results of this study will be used by experts in order to design a Dutch national data set.

Reference List