Description of local adaptation of national guidelines and of active feedback for rationalising preoperative screening in patients at low risk from anaesthetics in a French university hospital

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Abstract

Objective—To describe the effect of local adaptation of national guidelines combined with active feedback and organisational analysis on the ordering of preoperative investigations for patients at low risk from anaesthetics.

Design—Assessment of preoperative tests ordered over one month, before and after local adaptation of guidelines and feedback of results, combined with an organisational analysis.

Setting—Motivated anaesthetists in 15 surgical wards of Bordeaux University Hospital, Region Aquitain, France.

Subjects—42 anaesthetists, 60 surgeons, and their teams.

Main outcome measures—Number and type of preoperative tests ordered in June 1993 and 1994, and the estimated savings.

Results—Of 536 patients at low risk from anaesthetics studied in 1993 before the intervention 80% had at least one preoperative test. Most (70%) tests were ordered by anaesthetists. Twice the number of preoperative tests were ordered than recommended by national guidelines. Organisational analysis indicated lack of organised consultations and communication within teams. Changes implemented included scheduling of anaesthetic consultations; regular formal multidisciplinary meetings for all staff; preoperative ordering decision charts. Of 516 low risk patients studied in 1994 after the intervention only 48% had one or more preoperative tests ordered (p<0.05). Estimated mean (SD) saving for one year if changes were applied to all patients at low risk from anaesthesia in the hospital 3.04 (1.23) mFF.

Conclusions—A sharp decrease in tests ordered in low risk patients was found. The likely cause was the package of changes that included local adaptation of national guidelines, feedback, and organisational change.

Keywords: preoperative tests; medical audit; guidelines

Introduction

Each year in France over 3.5 million anaesthetics are given to people undergoing surgical, obstetric, or diagnostic procedures. Most are for patients for whom an anaesthetic carries very little risk and are in class I of the American Society of Anaesthesiology classification of anaesthetic risk (ASA1). Routine preoperative tests for this large group of fit patients have been shown to have little diagnostic use and do not add to the safety of the anaesthetic. Despite numerous recommendations arguing for selective use of these tests—for example, those of the French Agence Nationale pour le Developpement de l’Evaluation Medicale (ANDEM) and the Societe Francaise d’Anesthesie Reanimation (SFAR)—routine preoperative tests on fit people are still requested in many French hospitals and are responsible for unnecessary excessive costs. Although 95% of French anaesthetists in 1991 said they knew about the national guidelines for preoperative testing and 80% were in favour of more targeting, there is evidence that their practice has not changed fundamentally since the publication of the guidelines. Various strategies have been proposed for modifying professional behaviour and implementing the guidelines. Some—such as training alone or passive feedback—have not proved very effective whereas others based on active feedback of data have had a better impact, particularly on ordering behaviour.

The impact of feedback on professional behaviour particularly on ordering investigations when included as part of the process of medical audit has been shown. The development of guidelines that incorporate scientific data with local practice can be used to change clinical practice. We were aware that the number of preoperative tests in our hospital was high and we were keen to implement change that would reduce the number of unnecessary tests. To do this we decided as well as promoting the local adaptation of the national guidelines to look critically at the organisational aspects of clinical behaviour and to implement a package of initiatives that linked measurement and active feedback with an analysis of the organisation of preoperative care. This paper describes that process of implementing those initiatives, and their impact on the requests for preoperative tests for fit ASA I patients undergoing surgery in 15 wards in the University Hospital of Bordeaux, France.
Methods

CONTEXT

Our university hospital has 3094 short stay beds. In the surgical division there are 108 anaesthetists and 144 surgeons working in 36 wards. In 1992, 55 687 anaesthetics were performed in this unit of which, working from national figures we estimated about 22 000 were for fit ASA1 patients. The project took place in 1993–4 There was no significant staff turnover in this time except for the residents who change wards every six months.

APPROACH

The first step was to set up a working group that included a coordinating anaesthetist, physicians, other anaesthetists, a public health physician, chief nurses, hospital managers, an economist, and an organisational manager who was on the staff of our hospital in collaboration with the national agency ANDEM.

The coordinating anaesthetist (PM) of our working group is one of four directors of anaesthetics at the hospital. He discussed the project with all anaesthetists in the 36 ward block. Forty two anaesthetists who were all motivated in that they had all indicated keenness to participate were involved in the project, which focused on the ASA1 patients cared for on the 15 wards where all anaesthetists had agreed to participate. These wards perform 40% of the total surgical activity in our hospital. Nine departments were represented (orthopaedics, digestive and vascular surgery, paediatrics, gynaecology, obstetrics, urology, ear nose and throat, ophthalmology, endoscopy). All 60 surgeons working in these 15 wards, the residents, and the nurses were informed about the project.

SAMPLE SIZE

The percentage of low risk patients for whom no preoperative tests were ordered was estimated, from published work, to be about 20%. To show unambiguous evidence of an improvement in practice we thought that following the intervention the proportion of patients for whom no preoperative tests were ordered needed to increase to 30%. With an p risk of 0.05 and a power of 95%, we calculated that we needed at least 423 patients in each group, for a one tailed test. From the activity data from the 15 wards we calculated that measurement periods of one month would be needed to be sure of including this number of patients.

FIRST MEASUREMENT

An initial prospective assessment of the use of preoperative tests on all fit low risk patients over one month was done in June 1993, before the first stage of the implementation of changes and the development and agreement of locally adapted guidelines. The classification of risk from anaesthesia was assessed independently by each anaesthetist just before anaesthesia and the following data were also collected by the anaesthetist: degree of emergency, organisation of anaesthetic consultation, types of anaesthesia and surgery, status and profession of the person who ordered preoperative tests (individual people were not identified), and any preoperative tests ordered. Preoperative tests included in the study were: chest radiography, electrocardiogram, coagulation studies, haemoglobin, blood group, electrolytes, glucose, urea, creatinine, and hepatic enzymes. Details of recovery room perioperative mortality were also collected. Anaesthetists involved in the study were asked to complete brief questionnaires about their patients. This process was helped by the involvement of one of the resident anaesthetists who visited each ward daily to help anaesthetists to collect data and maintain motivation. Surgeons, other residents, and nurses were not involved in data collection.

DEVELOPMENT OF GUIDELINES

During a two month period the national guidelines for preoperative investigation of patients were discussed in each department and each department was asked to adapt the guidelines to meet local circumstances and surgical specificity. This process had three phases.

First phase

The coordinating anaesthetist presented the national—ANDEM and SFAR—guidelines at a meeting of all anaesthetists—seniors and residents—in each of the nine departments, recorded who attended these meetings.

Second phase

The coordinator conducted a further two hour meeting in each department when the national guidelines were presented again—this time focusing on the level of evidence—and included a discussion of the framework for local guidelines which advocated the general rule that no preoperative tests should be ordered for patients at low risk from anaesthesia but allowed for several exceptions to be decided upon by common consent in each department. Consensus about exceptions for each department was reached at the end of the meeting. The second meeting was held about a month after the first to give the departments time to consider their response to the guidelines.

THIRD PHASE

Each anaesthetist received the departmental guidelines and had to approve them.

The difference between the number of tests ordered during the first assessment and those expected according to local guidelines was analysed by the working group. These results were sent back to all members of each department in several ways. Firstly, an abstract was sent to each professional working on the 15 wards. Second, all the results were also communicated by the working group of all the anaesthetists working on the wards involved in the study, and discussed at a meeting in November 1993. Finally, each department organised a submeeting to discuss these results to take into account the opinion of the anaesthetists, surgeons, and technical staff.

ORGANISATIONAL MANAGEMENT

The organisational manager (MNP) studied preoperative ordering and the communication
processes in each department. During a meeting with the principle anaesthetists in each department involved in the project she analysed and discussed the following: (a) who ordered preoperative investigations, when, where, and how they were ordered, (b) the mode of communication between staff members, and (c) how anaesthetic consultations were organised.

For each department, MNP constructed an algorithm of the consultation and ordering processes to facilitate understanding of weak-
nesses in the system. Six months after the start of the project in January 1994, the working group arranged meetings with the anaesthetists in each department to discuss the points outlined by the organisational consultant and the results of the first set of measurements and to decide on changes in the light of these findings.

SECOND MEASUREMENT
A second measurement period took place in June 1994, about six months after implementation of change. The same process as for the first measurement was used to assess whether the process of change had resulted in improvement.

ASSESSMENT OF ANY SAVINGS
The mean cost of preoperative testing was calculated for the two measurement periods with standard costs based on the French National Nomenclature Generale des Actes Professionnels which gives costs for all standard investigations. The annual saving to the hospital was estimated by simply extrapolating from the savings estimated in our sample to the estimated total number of fit low risk patients operated on in this hospital in 1992 (22 000 low risk patients).

STATISTICAL ANALYSIS
Investigations for patients undergoing different types of anaesthesia and surgery performed during the two evaluation periods were compared by the \( \chi^2 \) test. The \( \chi^2 \) test was also used to assess the significance of changes in the proportion of patients for whom no tests were ordered and those who had perioperative adverse effects in the two test periods. The mean (SD) ages of children and adults is given and distributions by age groups were compared by the \( \chi^2 \) test.

Results
FIRST MEASUREMENT
During the first measurement period 536 low risk patients were included, representing 40% of the anaesthetic activity of the wards studied. Mean (SD) age for children (<18 years) was 6.8 (4.9) years and for adults it was 36.3 (12.7) years.

Thirteen patients were noted to have minor perioperative events—for example, headache, vomiting, mild hypertension. No patient died.

One hundred and eight patients (20%) did not have preoperative tests. Most preoperative tests were instigated by anaesthetists who ordered them for 70% of those patients who had preoperative tests; surgeons ordered tests for 8.4% of patients; nurses for 7.8%; residents for 3.0%, and general practitioners for 2.6%. For 8.2% of patients the person ordering the tests was not indicated on the questionnaire.

Coagulation testing and haemoglobin were the tests ordered most often. When compared with local guidelines that had been agreed by the departments, tests for haemoglobin and coagulation, and chest radiography were carried out on twice as many patients than were indicated by the guidelines. Fibrinogen and hepatic enzyme tests, although not recommended by the anaesthetists, were sometimes ordered by them. These results were made known to all anaesthetists in the departments. The aim of the feedback was to make everyone aware of the difference between the actual pattern of test ordering and the agreed guidelines.

ORGANISATIONAL ANALYSIS
The analysis performed by the organisational manager in collaboration with the anaesthetists and their teams showed much variation in the processes of ordering and organisation in each department. Separate algorithms of these processes were produced for each department.
Table 1 Comparison of age groups, type of anaesthesia, and surgery performed for patients at low risk from anaesthesia (ASA I) in the two samples (June 1993 and June 1994) in the University Hospital of Bordeaux, France

<table>
<thead>
<tr>
<th>ASA I patients</th>
<th>1993 (n=536)</th>
<th>1994 (n=516)</th>
<th>p Value†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group (y):*</td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
</tr>
<tr>
<td>&lt;5</td>
<td>129 (24.25)</td>
<td>110 (21.32)</td>
<td>0.11</td>
</tr>
<tr>
<td>6–15</td>
<td>123 (23.12)</td>
<td>153 (29.65)</td>
<td></td>
</tr>
<tr>
<td>16–30</td>
<td>111 (20.87)</td>
<td>125 (24.23)</td>
<td></td>
</tr>
<tr>
<td>31–45</td>
<td>107 (20.11)</td>
<td>85 (16.47)</td>
<td></td>
</tr>
<tr>
<td>&gt;45</td>
<td>62 (11.65)</td>
<td>43 (8.33)</td>
<td>0.02</td>
</tr>
<tr>
<td>Type of anaesthesia:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General anaesthesia</td>
<td>309 (95)</td>
<td>483 (94)</td>
<td>0.34</td>
</tr>
<tr>
<td>Locoregional anaesthesia</td>
<td>27 (5)</td>
<td>36 (6)</td>
<td></td>
</tr>
<tr>
<td>Type of surgery:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled</td>
<td>375 (70)</td>
<td>345 (67)</td>
<td></td>
</tr>
<tr>
<td>Emergency</td>
<td>75 (14)</td>
<td>63 (12)</td>
<td></td>
</tr>
<tr>
<td>Ambulatory</td>
<td>86 (16)</td>
<td>108 (21)</td>
<td>0.11</td>
</tr>
</tbody>
</table>

*Data given for 532 patients in 1993.
†χ² test was used to compare age groups, type of anaesthesia, and surgery between 1993 and 1994.

However, several common points emerged (fig 1). When a patient was not seen by the anaesthetist during a consultation or just after admission (fig 1, test ordering processes 1, 2, 3, 4), then tests could be ordered routinely usually by a nurse (ordering process 5). Furthermore, lack of formally organised anaesthetic consultations was highlighted in seven departments out of nine. Regular formal multidisciplinary meetings that included anaesthetists, surgeons, and nurses only occurred in the urology department. Information sheets to transmit patient data were only used in two departments, ear, nose, and throat and paediatrics. Difficulties in changing their mind and fear of legal action were two of the reasons for anaesthetists ordering unnecessary preoperative investigations.

Proposals for change were discussed and implemented within each department. Two departments chose to set up a system for formal consultation, which involved organising special consultation rooms, a secretary, and assuring the availability of anaesthetists. Other departments organised formal preoperative assessment sessions whereby anaesthetists could assess patients’ fitness before surgery (fig 1, test ordering processes 1, 2, 3, 4). Regular formal meetings were set up between anaesthetists. Decision charts to help anaesthetists to order tests (according to Blery et al10) for low risk patients according to the local guidelines and for patients at higher risk were implemented in three departments and displayed in the nurses’ room and anaesthetists’ office (fig 2).

SECOND MEASUREMENT

Four months later after the implementation of the organisational changes recommended by MNP, 516 low risk patients were included in a second sample. The two samples were comparable except for patients’ age (table 1). Mean (SD) age of children was 7.8 (3.0) years and for adults it was 34.07 (11.97) years. The number of patients who did not have any preoperative testing was 268 (52%) in 1994 and 108 (20%) in 1993 (χ² = 115; p < 0.00001). Most tests were ordered significantly less often in 1994 (table 2). Minor perioperative morbidity was noted for 11 patients (2.1%) in 1994 and 13 patients (2.4%) in 1993 (χ² = 0.10; p = 0.75).

No patient died.

SAVINGS

1993: first sample

Mean cost of testing per patient was Fr270 (95% confidence interval (95% CI) 238 to 302), or Fr44 (95% CI 39 to 50); or ECU 41 (95% CI 36 to 46).

1994: second sample

Mean cost of testing per patient was Fr132 (95% CI 108 to 156); or $22 (95% CI 18 to 26); or ECU 20 (95% CI 16 to 24).

The estimated annual saving was Fr3.04 million (95% CI 1.88 to 4.27) for 22 000 low risk patients treated in the hospital each year.

Discussion

We found a sharp drop in the number of preoperative tests ordered by anaesthetists after local adaptation of national guidelines combined with active feedback about their practice and implementation of practice and discussion about organisational changes. Clinical audit is not an appropriate design to establish a causal relationship between intervention and effect10 21 and caution must be exercised in drawing such conclusions from studies of this type. Nevertheless the changes were profound and coincided not only with feedback of practice but a radical appraisal of the organisational basis for preoperative assessment.

The patients treated during the two measurement periods were similar in most respects although the age of the adults in the second group was significantly lower. This difference is only likely to impact on the results if national and local guidelines had age criteria for ordering tests. This only applies to the guidelines for ordering for ECGs,10 so we estimate that the overall effect of the age bias is likely to be slight.

The anaesthetists who took part in this study were volunteers and not randomly selected. Thus they were much more likely to be receptive to changes in practice than those who did not take up the invitation to be included in this project. We do not know yet whether the project has had any effect on the use of preoperative tests on other wards. Moreover this...
The coordinating anaesthetist here was an influential leader and his role as facilitator was crucial. He had to clarify the purpose of the project and its challenges to achieve an agreement on the guidelines. If the anaesthetists wished to enlarge the indications for ordering tests they then entered an iterative process which progressively resulted in solutions that met the national guidelines.

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