ORIGINAL ARTICLE

A national survey on current practice of preanaesthetic assessment in elective surgery patients in Spain

J. Mata a, *, S. Cabrera b, M.I. Valdeperas a, S. Fernández a, J.L. Aguilar a, P.G. Atanassoff c

a Servicio de Anestesiología y Reanimación, Hospital Son Llàtzer, Palma de Mallorca, Baleares, Spain
b Instituto Catalá de Oncología, Hospital Germans Trias i Pujol, Barcelona, Spain
c Facultad de Medicina, Universidad de Yale, New Haven, CT, United States

Received 8 September 2011; accepted 23 April 2012
Available online 27 June 2012

KEYWORDS
Assessment, Preanaesthetic; Preoperative period; Research, Anaesthesia; Anaesthesia survey

Abstract

Objective: To analyse the preanaesthetic assessment prior to elective surgery in hospitals of the Spanish National Health Care System.

Methods: A prospective cross-sectional descriptive observational survey was performed. Primary variables were patient characteristics, type of preanaesthetic evaluation and the evaluator, as well as type of support the evaluator received during patient assessment. Secondary variables included the number of operating rooms available for elective surgery, as well as preanaesthesia clinic facilities. Data were analysed by univariate and bivariate descriptive analysis.

Results: A total of 214 hospitals of the Spanish Health Care System were invited to participate, and 203 centres responded, with all of them having a preanaesthesia assessment clinic. In 183 of them (90%), elective surgery patients were interviewed prior to their surgical intervention, and in 202 hospitals (99.5%) a anaesthesiologist physician performed the interview. In 128 hospitals (63%), anaesthesiologists were helped during preoperative assessment by nurses alone (49%) or together with auxiliary nurses (14%). In 68 of hospitals (33%) they were supported only by auxiliary nurses and in 7 hospitals (3%) they obtained no help at all. In 14 centres (7%) anaesthesia nurses assessed patients directly (under supervision of an anaesthesiologist physician). Hospitals with a higher volume of patients performed more preanaesthesia interviews. Hospitals with more running operating rooms received more nurse support in the preanaesthesia assessment clinic.

Conclusions: Some kind of preanaesthesia assessment clinic exists in all Anaesthesia Departments of public Spanish hospitals, although there are differences in design and organisation.

© 2011 Sociedad Española de Anestesiología, Reanimación y Terapéutica del Dolor. Published by Elsevier España, S.L. All rights reserved.

* Corresponding author.
E-mail address: jmata@hsll.es (J. Mata).

This article is part of the Continuing Medical Education Program in Anaesthesiology and Resuscitation. The evaluation of the questions in this article can be made on the internet via the following web page: www.elsevierfmc.com
PALABRAS CLAVE
Evaluación Preanestésica; Periodo preoperatorio; Investigación, Anestesia; Encuesta de anestesia

Encuesta sobre la situación actual de la evaluación preoperatoria en los hospitales de España

Resumen
Objetivo: Analizar la práctica común en las consultas externas preanestésicas de los pacientes sometidos a cirugía electiva en los hospitales públicos españoles.
Material y métodos: Estudio observacional descriptivo transversal. Las variables principales de estudio fueron: características de los pacientes, tipo de evaluación preanestésica realizada, profesional evaluador y tipo de apoyo durante el proceso de evaluación. Como secundarias se contemplan: número de quirófanos de cirugía programada y número de consultas preanestésicas. Se realizó análisis descriptivo univariante.
Resultados: Fueron invitados a participar 214 hospitales del Sistema Nacional de Salud. Los 202 que finalmente participaron en la encuesta, disponían de consultas externas preanestésicas. En 183 de ellos (90%) pasan por dicha consulta todos los pacientes candidatos a intervención quirúrgica programada y en 202 (99,5%) la valoración preanestésica es realizada por un anestesiólogo del equipo. Reciben apoyo de una enfermera en 128 hospitales (63%), sola (49%) o junto a un auxiliar de enfermería (14%). En 68 de ellos (33%) es un auxiliar de enfermería el que ayuda en la consulta preoperatoria, mientras que en 7 centros (3%) no cuentan con ningún apoyo. En 14 de los centros (7%) las enfermeras realizan la consulta valoraciones preanestésicas de forma autónoma tuteladas por un anestesiólogo. Centros con un mayor número de pacientes disponen de mayor número de consultas preanestésicas. Hospitales con un mayor número de quirófanos funcionan reciben en mayor proporción el apoyo de una enfermera en la consulta preoperatoria.
Conclusiones: La instauración de algún tipo de consulta externa preanestésica está asumida por la totalidad de los Servicios de Anestesiología de los hospitales públicos españoles. Aunque hay diferencias en el diseño y la organización.

© 2011 Sociedad Española de Anestesiología, Reanimación y Terapéutica del Dolor. Publicado por Elsevier España, S.L. Todos los derechos reservados.

Introduction
Preoperative assessment of the anaesthetic risk in patients undergoing elective surgery is common practice, and is recommended worldwide by Anaesthesiologist Societies.1,2 The objective of this assessment is to obtain an early insight into the patient’s health status and to evaluate coexisting diseases and thus modifying, delaying, or if necessary, cancelling surgery. It is also useful to set up the most favourable pre- and perioperative status, to establish an anaesthetic plan and to reduce patient anxiety. Finally, anaesthesiologists usually obtain the written informed consent at the end of this assessment.2,3,4 Excessive preoperative information on the patients’ health proves to be cost-effective, in that both additional preoperative work-up, as well as delaying or cancelling surgery for medical reasons, were reduced thus improving overall patient welfare and outcome.4-6

Patients who do not receive a preanaesthesia assessment are at risk of being inadequately managed. In our experience, an anaesthesiologist on duty with a great workload is frequently expected to perform the interview, and this poses additional problems as patients with serious coexisting diseases may not receive sufficient care, an emergency case could be declared and, eventually, surgery needs to be cancelled as there was no preanaesthetic assessment. Patients would then be distressed, and loss of revenues may arise from unused operating rooms (OR).

The aim of the present study was to present a review on common practice in preanaesthesia assessment clinics (PAC) in Spanish public hospitals.

Methods
A prospective cross-sectional survey was performed to determine the detailed preoperative patient assessment procedures in Spanish hospitals.

According to the 2008 Spanish National Hospital Catalogue there were 315 public hospitals in Spain.9 Between June and December 2009, questionnaires containing 57 multiple choice and 16 short answer questions were sent to all Anaesthesia Departments of the Spanish National Health System. Informed consent for the study was obtained from all participating centres.

A minimum of 179 out of the 214 hospitals were calculated to be needed to answer the questionnaire for a useful 95% confidence interval, a precision of 3%, and a hypothetical amount of preanaesthesia interviews of 50%, as estimated by Openei software (Open Source Epidemiological Statistics for Public Health, 2.3.1, Atlanta, GA, USA [Updated: 2010 Sep 09]). We used non-probability samples of consecutive cases, including those hospitals that voluntarily responded to the survey.

Inclusion criteria were as follows: hospitals with a surgical and anaesthesia department, and voluntary participation. Exclusion criteria were incomplete or equivocal answers in more than 50% of the questions.

Primary variables were: (a) patient characteristics (in-, out-patients), (b) the type of survey performance (defined as type of preoperative evaluation and tests used for the elective surgery procedure), (c) who was the patient’s interviewer i.e. the healthcare professional taking care
of patients in the PAC, and (d) the type of support an interviewer received during patient assessment (i.e. if he/she was supported by a nurse and/or an auxiliary nurse, and what kind of help he/she received). Secondary variables included: (a) the number of OR available for scheduled surgeries (defined as number of operating rooms ready for elective interventions both in the morning and the afternoon), (b) PAC facilities representing the organisational structure of a PAC (e.g. the number of preanaesthesia interviews performed on a daily basis and on a weekly basis, as well as the minimum and maximum amount of preanaesthetic interviews per day).

Potential differences with respect to facilitating and limiting factors in hospitals with different levels of workload, as well as different infrastructures of PACs and overall surgical activities were anticipated. Consequently, hospitals were divided into seven categories or levels according to the surgical sub-specialities they served. Hospitals of the first group representing high resolution Hospitals (level 1), e.g. centres usually located far form large cities, where patient turnover is rapid, and assessments, work-up, and patient treatment are frequently performed on just one occasion. Surgical departments such as general surgery, orthopaedics-traumatology, ophthalmology, ENT, and urology are available in this type of hospital. In addition second level centres served by gynaecology-obstetrics, and third level centres also with plastic and maxillofacial surgery. Besides the previously mentioned sub-specialities, vascular surgery is performed in fourth level hospitals; thoracic and neurosurgery in fifth level centres, and paediatric and cardiac surgery in sixth and seventh level hospitals, respectively.

Participating hospitals were contacted by telephone and answered the questions through a dedicated website. Two and four months following the initial contact, anaesthesia departments (Heads of the Anaesthesia Department or Clinical Chief of Preoperative Assessment was contacted) were reminded to report their results. Results were stored in a database in a computer to eventually be analysed.

Data were analysed by univariate and bivariate descriptive analysis using the SPSS software version 15.0 for Windows (SPSS Inc., Chicago, USA). The median and interquartile ranges for quantitative variables were calculated for the description of sample characteristics e.g. the number of OR in each hospital and the number of preanaesthetic assessments. For qualitative variables, such as the existence of PAC or type of support provided during assessment, data are presented as number of cases and frequencies.

For the bivariate or comparative analysis, normal distribution of data was evaluated by means of the Kolmogorov–Smirnov and the Shapiro Wilkenson tests. For analysis of the number of OR and type of support obtained during preanaesthetic assessments, Student’s t-test was used. To investigate the care activity by type of hospital, the Kruskal–Wallis test was employed. Finally, we analysed the relationship between two quantitative variables, such as the number of OR and care activity by using Spearman test, assuming a predetermined 5% for Type I error.

### Table 1  Distribution of the hospitals that responded to the questionnaire among the Spanish regions.

<table>
<thead>
<tr>
<th>Spanish regions</th>
<th>Number</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andalucia</td>
<td>29</td>
<td>(14.3)</td>
</tr>
<tr>
<td>Aragón</td>
<td>9</td>
<td>(4.4)</td>
</tr>
<tr>
<td>Canarias</td>
<td>7</td>
<td>(3.5)</td>
</tr>
<tr>
<td>Cantabria</td>
<td>3</td>
<td>(1.5)</td>
</tr>
<tr>
<td>Castilla y León</td>
<td>14</td>
<td>(6.9)</td>
</tr>
<tr>
<td>Castilla-La Mancha</td>
<td>18</td>
<td>(8.9)</td>
</tr>
<tr>
<td>Cataluña</td>
<td>27</td>
<td>(13.3)</td>
</tr>
<tr>
<td>Ciudad Autónoma de Ceuta</td>
<td>0</td>
<td>(0)</td>
</tr>
<tr>
<td>Ciudad Autónoma de Melilla</td>
<td>0</td>
<td>(0)</td>
</tr>
<tr>
<td>Comunidad de Madrid</td>
<td>12</td>
<td>(5.9)</td>
</tr>
<tr>
<td>Comunidad Foral de Navarra</td>
<td>6</td>
<td>(3)</td>
</tr>
<tr>
<td>Comunidad Valenciana</td>
<td>24</td>
<td>(11.8)</td>
</tr>
<tr>
<td>Extremadura</td>
<td>8</td>
<td>(3.9)</td>
</tr>
<tr>
<td>Galicia</td>
<td>12</td>
<td>(5.9)</td>
</tr>
<tr>
<td>Islas Baleares</td>
<td>7</td>
<td>(3.5)</td>
</tr>
<tr>
<td>La Rioja</td>
<td>1</td>
<td>(0.5)</td>
</tr>
<tr>
<td>País Vasco</td>
<td>8</td>
<td>(3.9)</td>
</tr>
<tr>
<td>Principado de Asturias</td>
<td>8</td>
<td>(3.9)</td>
</tr>
<tr>
<td>Región de Murcia</td>
<td>10</td>
<td>(4.9)</td>
</tr>
</tbody>
</table>

Data are number (%) of hospitals.

### Results

Two hundred and three hospitals (95%) answered the questionnaires, representing a precision of 2% with a 95% confidence interval. The regional distribution of the list of centres is shown in Table 1.

Number of OR, preanaesthesia interviews (PIs) and patients interviewed in external centres are shown in Table 2.

All hospitals responding to the survey had a PAC in its portfolio. Results of the responses in PIs in patients scheduled for elective surgery and in outpatients are included in Table 3. In 99.5% of the hospitals an anaesthesiologist was responsible for the initial patient assessment, and in 9% of them an anesthesiac resident under supervision, and in 8% an anaesthetics nurse. In 0.5% of patients, an physician internist, generalist or a gastroenterologist performed the preanaesthesia assessment.

In 128 hospitals (63%) the anaesthesiologists were helped during preoperative assessment by a nurse alone (49%) or together with auxiliary nurses (14%). In 68 of hospitals (33%) anaesthesiologists were supported only by auxiliary nurses, and in 7 hospitals (3%) they obtained no help at all. In 14 centres (7%) an anaesthesia nurses assessed patients directly (under supervision of a physician anaesthesiologist).

In 108 centres (60%) elective surgery patients were interviewed by the anaesthesiologist one month before surgery, in 75 of them (37%) three months prior to the intervention, and in 18 hospitals (9%) just a week before surgery. Close to 60% of the centres (121) used guidelines on preoperative evaluation of patients, the remaining performing routine preoperative testing.

A statistical significance can be observed between the number of OR ready for scheduled interventions both in
Table 2  Preanaesthetic activity distribution by hospital levels. Numbers of operating rooms (OR) used per day, preanaesthetic interviews (PIs) on a daily and weekly basis as well as patients interviewed in external centres.

<table>
<thead>
<tr>
<th>Level</th>
<th>No. centres</th>
<th>Operating rooms (n)</th>
<th>PI weekly (n)</th>
<th>PI daily (n)</th>
<th>Patients interviewed (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Median (Quartiles)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td>6</td>
<td>9.0 (6.5–12.2)</td>
<td>6.5 (5.2–13.0)</td>
<td>1.0 (1.0–2.5)</td>
<td>17.5 (15.0–20.0)</td>
</tr>
<tr>
<td>Level 2</td>
<td>94</td>
<td>5.0 (3.0–7.7)</td>
<td>5.0 (4.0–5.7)</td>
<td>1.0 (0.0–1.0)</td>
<td>20.0 (17.0–25.0)</td>
</tr>
<tr>
<td>Level 3</td>
<td>11</td>
<td>7.0 (6.0–9.5)</td>
<td>5.0 (5.0–7.5)</td>
<td>1.0 (1.0–1.0)</td>
<td>24.0 (19.5–27.0)</td>
</tr>
<tr>
<td>Level 4</td>
<td>19</td>
<td>10.0 (6.0–11.5)</td>
<td>9.0 (5.0–10.0)</td>
<td>2.0 (1.0–2.0)</td>
<td>25.0 (16.2–25.0)</td>
</tr>
<tr>
<td>Level 5</td>
<td>12</td>
<td>12.5 (10.7–15.2)</td>
<td>9.5 (5.7–11.0)</td>
<td>1.5 (1.0–2.0)</td>
<td>25.0 (20.0–30.0)</td>
</tr>
<tr>
<td>Level 6</td>
<td>27</td>
<td>15.0 (10.0–15.0)</td>
<td>10.0 (5.0–12.0)</td>
<td>2.0 (1.0–2.0)</td>
<td>30.0 (20.0–37.5)</td>
</tr>
<tr>
<td>Level 7</td>
<td>34</td>
<td>22.0 (18.0–31.5)</td>
<td>15.0 (10.0–20.0)</td>
<td>3.0 (2.0–4.0)</td>
<td>25.0 (20.0–37.5)</td>
</tr>
</tbody>
</table>

Kruskal–Wallis test, all comparisons were significant (P < .001).

Table 3  Results of preanaesthesia interviews (PIs) in in-patients and in outpatients.

<table>
<thead>
<tr>
<th>Type of patients seen in PAC</th>
<th>In-patients</th>
<th>Outpatients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=203)</td>
<td>(n=203)</td>
</tr>
<tr>
<td>All patients</td>
<td>168</td>
<td>153</td>
</tr>
<tr>
<td>Only patients with anaesthesiologist management</td>
<td>29</td>
<td>42</td>
</tr>
<tr>
<td>Only high risk surgery patients</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>No patients</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Data are number (%) of type of patients.

the morning and the afternoon, and the number of PIs performed on a daily (r = 0.787, P < .001) or weekly basis (r = 0.801, P < .001). Centres with more surgical interventions had a higher number of PIs (Fig. 1). Comparison of the presence of an anaesthesia nurses or auxiliary nurse in the PAC with the number of OR only yielded a statistical difference for the former, i.e. the more running OR, the more support by anaesthesia nurses (P = .015, Table 4). There was a significant difference in the activities of PAC and type of surgical procedures performed (Fig. 2).

Discussion

This survey demonstrates that PAC have become routine in the vast majority of Spanish public hospitals. This contrasts with results from other countries, such as the Netherlands, where these clinics were routinely used in only 50% of the centres in 2000, increasing to 74% in 2004. The American Society of Anesthesiologists (ASA) reported in 2005 that 69% of US anaesthesia physicians work in centres have a PAC. A survey performed in Spain in 1988 revealed that in 82% of Spanish hospitals a preanesthesia visit was daily practice, but only 29% of the hospitals had a formal PAC. In 2001, two studies showed that the number of PAC had increased to 81%, and in 2006 (data from Catalonia) the hospitals with a PAC increased to 91.5%. Currently, and this can be concluded from our survey, all Spanish public hospitals have some kind of PAC.

In in-patients, the anaesthesia team interviews them in a PAC in around 83% of the participating centres. In outpatients, only 75% of the centres do so, while in 50% of Dutch hospitals, patients are first interviewed just prior to entry into the operating room. In 2006, anaesthesiologists from

Table 4  Relationship between anaesthesia nurses in the preanaesthesia assessment clinics (PAC) with the amount of operating rooms (OR).

<table>
<thead>
<tr>
<th>Relationship between preoperative assessment and nurses</th>
<th>Nurse</th>
<th>Auxiliary nurse</th>
</tr>
</thead>
<tbody>
<tr>
<td>The interview anesthesiologist receive help</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Sig.</td>
</tr>
<tr>
<td>Operating rooms per day</td>
<td>9.2 (7.1)</td>
<td>12.4 (9.8)</td>
</tr>
<tr>
<td>Preanaesthesia interviews per day</td>
<td>1.3 (1.1)</td>
<td>1.6 (1.3)</td>
</tr>
<tr>
<td>Preanaesthesia interviews per week</td>
<td>7.5 (4.8)</td>
<td>8.5 (5.7)</td>
</tr>
</tbody>
</table>

* t test, differences significant (P < .05).
Catalonia in Spain were asked to report on preoperative patient evaluation. Close to 60% of in-patients and almost 70% of outpatients scheduled for surgery were assessed in a PAC.16 As regards time elapsing between a preanaesthesia interview and surgery, Vilarrasa17 reported less than one month in 63% of cases, and more than two months in close to 15% of them. In general, there is a time frame between one and three months.

The responsibilities in the PAC are mostly taken by a staff anaesthesiologist, who, according to the data of the present study, at times receives help from an anaesthesia resident (9%) or an anaesthesia nurse (8%). In Spain, there are nurses in the majority of PAC, nurses alone in 49% or together with auxiliary nurses in 14%. This implies both small and large hospitals, except for level 4 hospitals where in 47% of them only auxiliary nurses were available. Canet et al.18 revealed in his investigation that anaesthesiologists were supported by nurses in 51% of their preanaesthesia visits, in 21% by auxiliary nurses, while in 28% they obtained no help at all, in contrast to 3% in the present study. In general, it can be assumed that there is an increase in support from other healthcare professional groups.

The global shortage of anaesthesiologists has led to the incorporation of nurses and auxiliary nurses in some anaesthesia tasks, particularly in PAC, where additional manpower is required for preoperative assessments.

Support by nurses is frequently limited to the recording of clinical data and ECG, or taking blood samples. In 7% of the anaesthesia departments nurses assess patients directly. Several studies17-20 have shown that they are often well-trained, capable of performing preanaesthesia assessments in selected patients and/or under supervision by a physician. In such cases, protocols with detailed instructions have to be followed more strictly. These protocols proved to be effective and safe.21 As a consequence, cancellations of surgery due to assessment failures by nurses were no different when compared to that of physicians, 0.7% versus 1.3%, respectively.17,20,22 Key aspects to optimising an assessment by nurses include well-defined protocols with an anaesthesiologist at hand in case of need. Thus from 7% to 27%17,23 re-assessments become unnecessary and time is saved.

As a preoperative assessment, the patients’ ASA physical status is taken into account in 60% of Spanish hospitals. Although scientific evidence suggests distinguishing between patients regarding tests needed,17,18,23-28 40% of anaesthesia departments still perform a couple of routine tests on every patient. This is presumably due to organisational problems or legal pressure, but is similar to other European countries.14,27,28 The prevalence of unexpected abnormalities in complementary routine preanaesthetic tests in asymptomatic patients is significant (6–10%), yet their impact on anaesthetic management was shown to be low (0.2–7%).29 Unnecessary preoperative work-up does not seem to offer any more legal protection or increase safety or efficiency.30 Instead, a meticulous preoperative assessment of the patient’s clinical history and a physical examination will detect coexisting diseases in approximately 97%.31

One possible limitation of our study could be the design of the questionnaire. This was based on a literature search specifically looking for the organisation and implementation of a preoperative assessment in hospitals. Another limitation may be the characteristics of the participating hospitals. Hospitals were divided into seven categories or levels according to their surgical sub-specialities, as we anticipated potential differences regarding the provision and limiting factors in hospitals with a different workload level, as well as the organisation of a PAC, but this has not been specifically tested.

We conclude that organisation and workload in a PAC are determined by surgical activity. This activity varies according to the amount of surgical sub-specialities. The present data showed that hospitals with a higher volume of patients perform more PIs. Hospitals with more running OR receive more nurse support in PAC. The number of active OR per day does not seem to be related to hospital size or amount of surgical sub-specialties, so level 1 hospitals show proportionally more extensive surgical activity than hospitals of higher levels, such as 2 or 3, similar to those of level 4. Larger hospitals (level 5–7) showed a greater surgical activity, which was clearly related to hospital size. A higher efficiency was noted in level 1 hospitals as compared to...
to levels 2 and 3, but similar to level 4 hospitals. This may be due to the different type of surgical interventions performed in each of the different hospitals.

Differences were found in the design and organisation of PAC activity, especially in the type and number of patients evaluated, the support the interviewers received, nurse activities, and preoperative testing. We suggest that an assessment team composed of an anaesthesiologist and a well-trained anaesthetics nurse would work together most efficiently, as was previously shown in PAC in other countries. Scientific evidence and clinical experience have demonstrated that these team models increase safety, decrease complication rates, and help to develop professional skills. These aspects may be supported by recently developed guidelines. They provide recommendations based on available relevant clinical evidence on the topic, such as when and by whom patients should be preoperatively assessed. To eventually create an optimal PAC setting, further well-designed and sufficiently powered randomised controlled trials are required to clearly determine which way to proceed in the future.

Conflict of interest

The authors declare no conflicts of interest.

Appendix A. Supplementary data


References