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Sedation for bronchoscopy: current practices in Latin America

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ABSTRACT

Objective: To evaluate current practices in sedation for bronchoscopy in Latin America. **Methods:** This was an anonymous survey of select members of the Latin American Thoracic Association. The questionnaire, made available online from November of 2015 through February of 2016, was designed to collect data on demographic characteristics; type of facility (public or private); type/volume of bronchoscopies; type of sedation; and type of professional administering the sedation. **Results:** We received 338 completed questionnaires from 19 countries; 250 respondents (74.0%) were male. The mean respondent age was 36.0 ± 10.5 years. Of the 338 respondents, 304 (89.9%) were pulmonologists; 169 (50.0%) worked at public facilities; and 152 (45.0%) worked at teaching facilities. All of the respondents performed diagnostic fiberoptic bronchoscopy, 206 (60.9%) performed therapeutic fiberoptic bronchoscopy, 125 (37.0%) performed rigid bronchoscopy, 37 (10.9%) performed endobronchial ultrasound, and 3 (0.9%) performed laser therapy/thermoplasty/cryotherapy. Sedation for bronchoscopy was employed by 324 respondents (95.6%). Of the 338 respondents, 103 (30.5%) and 96 (28.4%) stated, respectively, that such sedation should "usually" and "never" be administered by a bronchoscopist; 324 (95.9%) supported training bronchoscopists in sedation. Sedation administered by a bronchoscopist was reported by 113 respondents, conscious sedation being employed by 109 (96.2%). The use of benzodiazepines, propofol, and opiates was reported, respectively, by 252 (74.6%), 179 (52.9%), and 132 (39.0%) of the 338 respondents. Deep sedation and general anesthesia were more common at private facilities. **Conclusions:** The consensus seems to be that a well-trained bronchoscopist can safely administer sedation for bronchoscopy. However, approximately 40% of bronchoscopists do not do so regularly.

Keywords: Bronchoscopy/methods; Conscious sedation/statistics & numerical data; Hypnotics and sedatives.

INTRODUCTION

Bronchoscopy is an invasive technique that causes discomfort and is difficult for many patients to tolerate.[1,2] Because of the increase in the number, types, and duration of diagnostic/therapeutic endoscopic procedures, together with the shift in societal attitudes regarding pain and discomfort during invasive procedures, the use of sedation in endoscopy is becoming more common. Guidelines recommend offering sedation to all patients undergoing bronchoscopy, except when there are contraindications,[1,2] to improve the tolerance and yield of the procedure. Nevertheless, many endoscopy teams currently perform most of their procedures without sedation. Sedation practices vary not only among countries but also among hospitals and even among bronchoscopists at individual hospitals.[3-6]

We set out to study the current sedation practices for bronchoscopy in Latin America. To that end, we made an online questionnaire available to the members of the *Asociación Latinoamericana de Tórax* (ALAT, Latin American Thoracic Association). The ALAT is a scientific society for health care professionals in Latin America with a common interest in respiratory maladies. When the questionnaire was made available (in November of 2015), the ALAT had 3,069 members, 481 of whom belonged to the Respiratory Endoscopy Section (ALAT-Endoscopy).

METHODS

The questionnaire consisted of 29 questions, most of which were closed-ended, multiple-choice questions. It was made available to ALAT-Endoscopy members via Google Forms, a web-based survey tool. The form was provided in Spanish (http://goo.gl/forms/2n72A7agJo) and in Portuguese (http://goo.gl/forms/tF6rEIIYQZ). The time estimated for its completion was 5-7 min. The links to the questionnaire and the accompanying e-mails were sent by the ALAT secretary, on behalf of the investigators and ALAT-Endoscopy, to the 481 ALAT-Endoscopy members. Five e-mails were sent to each potential respondent: two initially informing them of the project and inviting them to participate; and three serving as reminders and announcing its closing.

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Respondents were asked to provide data on demographic characteristics; the type of facility (public or private); the type and volume of the bronchoscopies performed; the type of sedation; and the type of professional administering the sedation. The questionnaire also comprised questions regarding the views of the respondents on sedation and on training bronchoscopists in sedation; regarding the techniques employed; regarding interventionism; and regarding the characteristics of the bronchoscopies performed, in the operating room and in the ICU. Respondents were also asked about their training in advanced life support and airway management. We defined sedation as any pharmacological intervention aimed at reducing the level of awareness and anxiety of the patient, to improve the tolerability of the procedure. The questions were based on those employed in previous, similar studies[3,5-7] and on the experience of the investigators. The questionnaires were completed anonymously and voluntarily between 1 November 2015 and 1 March 2016.

RESULTS

Of a total of 354 questionnaires received, 16 were excluded: 15 because they were duplicates; and 1 because it had been completed by a nurse rather than by a physician. We did not exclude any questionnaires for being incomplete, although 12 had one unanswered question and 1 had two unanswered questions (none of the unanswered questions being about sedation). We analyzed 338 surveys, corresponding to 70.3% of the 481 ALAT-Endoscopy members contacted.

Of the 338 respondents, 250 (74.0%) were male and 174 (51.4%) were under 45 years of age (Table 1). A total of 19 countries were represented (Figure 1).

The number of bronchoscopies and the size of the facility (number of beds) were directly related: 128 (37.9%) of the respondents reported that the number of bronchoscopies/year at their facilities was < 100, 105 (31.1%) reported that number to be 100-300, 51 (15.1%) reported it to be 300-600, and 54 (16.0%) reported it to be > 600. Of the 338 respondents, 152 (45.0%) worked at medical centers with resident training programs, which were also the facilities where a higher volume of bronchoscopies were performed and a broader range of techniques were employed.

All of the specialists surveyed reported that diagnostic fiberoptic bronchoscopy was the primary procedure performed. Therapeutic fiberoptic bronchoscopy was the second most common procedure, performed by 206 (60.9%) of the respondents, followed by rigid bronchoscopy, performed by 125 (37.0%); radial endobronchial ultrasound, performed by 17 (5.0%); linear endobronchial ultrasound, performed by 20 (5.9%); and laser therapy, thermoplasty, or cryotherapy, performed by 3 (0.9%). The sample collection techniques employed most frequently in the last year were bronchoalveolar lavage, employed by 331 (97.9%) of the respondents, bronchial brushing, employed by 303 (89.6%), transbronchial lung biopsy, employed by 294 (87.0%), and transbronchial needle aspiration, employed by 108 (32.0%). Of the 338 respondents, 214 (63.3%) reported that the specialist in charge opted to introduce the bronchoscope nasally, 70 (20.7%) reported that it was introduced orally, and 32 (9.5%) reported that it was introduced through a laryngeal mask; 12 (3.6%) reported that endotracheal intubation was used.

We explored the perceptions of bronchoscopists regarding sedation. Of the 338 respondents, 211 (62.5%) stated that they believed sedation was "always" necessary during bronchoscopies, whereas 120 (35.5%) stated that it was "occasionally" necessary and 7 (2.1%) stated that it was "never" necessary (Figure 2).

As illustrated in Figure 3, sedation was used in all bronchoscopies by 14 (4.1%) of the respondents, whereas it was not used in any of the bronchoscopies performed by another 14 (4.1%). On the question about how often bronchoscopies were performed under sedation at the respective medical centers, 211 (62.5%) of the respondents answered "regularly", 69 (20.5%) answered "occasionally", 44 (13.0%) answered "rarely", and 14 (4.1%) answered "never" (Figure 4).

Of the 324 specialists who reported that sedation was employed for bronchoscopy (Figure 5), 186 (57.4%) reported that it was administered by an anesthetist, 113 (34.9%) reported that it was administered by a bronchoscopist, and 25 (7.7%) reported that it was sometimes administered by an anesthetist and sometimes administered by a bronchoscopist. Of the 338 respondents in the sample as a whole, 103 (30.5%) were of the opinion that sedation for bronchoscopy should "always" or "usually" be administered by a bronchoscopist, whereas 96 (28.4%) believed that the bronchoscopist should "never" administer it. The remaining 140 (41.4%) believed that bronchoscopists should "sometimes" perform this task. When a bronchoscopist performed the sedation, it was almost always conscious sedation, which was commonly employed by 109 (96.2%) of the 113 bronchoscopists who administered sedation for bronchoscopy. Only 11 (3.2%) of the 338 respondents reported using deep sedation. The most commonly used drugs were benzodiazepines, which were administered by 242 (74.6%) of the 324 specialists who reported that sedation was employed for bronchoscopy, followed by propofol, administered by 171 (52.9%), opiates, administered by 126 (39.0%), and ketamine, administered by 11 (3.5%). Sedation performed by a bronchoscopist is considered safe, our respondents giving it a mean safety rating of 3.8 ± 1.2 out of 5.0 (95% CI: 3.7-3.9; median, 4). Of the 338 respondents, 227 (67.2%) indicated that sedation performed by bronchoscopists is quite safe or safe, whereas 17 (5.0%) indicated that it is not safe at all, and 324 (95.9%) expressed their support for ALAT-sponsored programs of training in sedation for bronchoscopists.

Table 1. Characteristics of the respondents and their medical centers. Latin American Thoracic Association survey, 2016.

Characteristic	(N = 338)
Gender, n (%)	
Male	250 (73.4)
Female	88 (26.0)
Age (years), mean ± SD (range)	47.0 ± 10.5 (28-75)
Age group, n (%)	
< 45 years	164 (51.4)
≥ 45 years	174 (48.6)
Specialty, n (%)	
Pulmonology	304 (89.9)
Thoracic surgery	21 (6.1)
Other	13 (3.8)
Recent training (last 5 years), n (%)	
Airway management	215 (63.6)
Advanced life support	223 (65.9)
Type of medical center, n (%)	
Public	169 (50.0)
Private	112 (33.1)
Mixed (public and private)	57 (16.9)
Size of the medical center, n (%)	
< 100 beds	84 (24.9)
100-300 beds	124 (36.8)
301-500 beds	70 (20.8)
> 500 beds	59 (17.5)

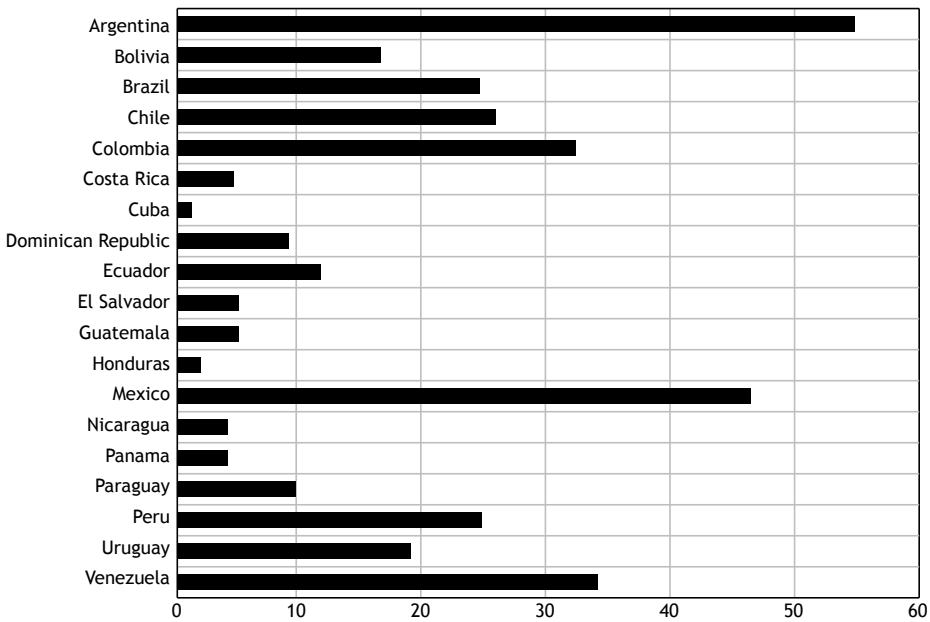

Figure 1. Current countries of residence of the respondents at the time of the 2016 survey of members of the Respiratory Endoscopy Section of the Latin American Thoracic Association.

The male respondents were older than were their female counterparts, with no differences among the medical centers surveyed. Multivariate analysis showed no significant differences between the male and female respondents in terms of the proportion who believed that bronchoscopy should always be performed under sedation (60.2% vs. 63.2%; p = 1.00) and that of those who believed that bronchoscopists should always receive specific training to perform sedation (47.1% vs. 42.3%; p = 0.429).

The study sample was divided into two groups by the age of the respondents: < 45 years of age (n = 164);

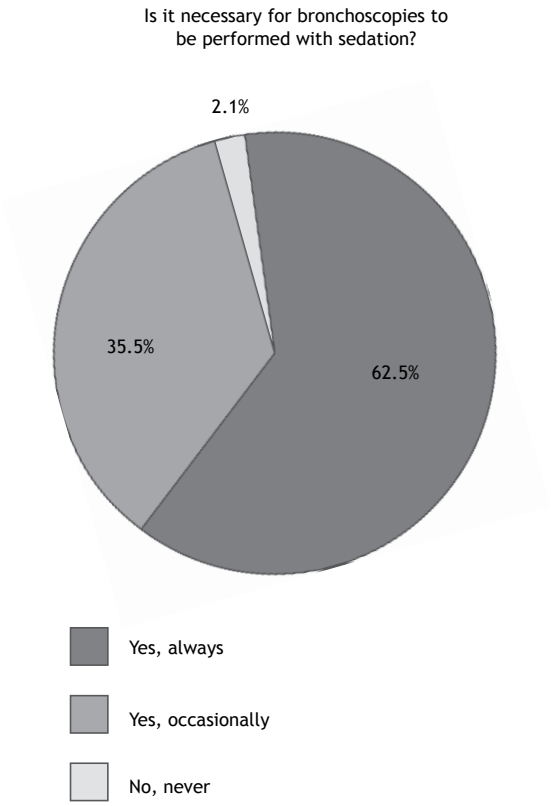

Figure 2. Proportional distribution of the responses regarding the need for sedation during bronchoscopy. 2016 survey of members of the Respiratory Endoscopy Section of the Latin American Thoracic Association.

and ≥ 45 years of age (n = 174). Among those ≥ 45 years of age, there were greater proportions of males, of specialists who worked in medical centers with fewer beds, and of specialists who worked at medical centers with no resident training. The proportion of respondents who believed that bronchoscopies should be performed without sedation was also higher in the ≥ 45-year age group (3.4% vs. 0.6%; p = 0.032), as was that of those reporting that an anesthetist was in charge of administering sedation for bronchoscopy (60.6% vs. 54.3%; p = 0.04). Of the bronchoscopists in the < 45-year and ≥ 45-year age groups, 66.3% and 68.4%, respectively, considered sedation performed by a bronchoscopist to be "safe" or "quite safe" (p = 0.546). In the latter group, the proportion of those who reported administering opiates was significantly higher (47.0% vs. 31.5%; p = 0.004), whereas that of those who reported using protected catheter techniques (for cytology or microbiology) was significantly lower (24.0% vs. 44.4%; p = 0.0001).

We found that the private medical centers had fewer beds than did the public medical centers. The proportion of male respondents was higher for the private medical centers. The respondents for the private medical centers were also older than were the respondents for the public medical centers. Resident training was reportedly less common at private medical centers than at public medical centers. The opinion that sedation should always be used for bronchoscopy was equally common among the respondents working at private medical centers and those working at public medical centers (69.7% and 60.7%, respectively; p = 0.355),

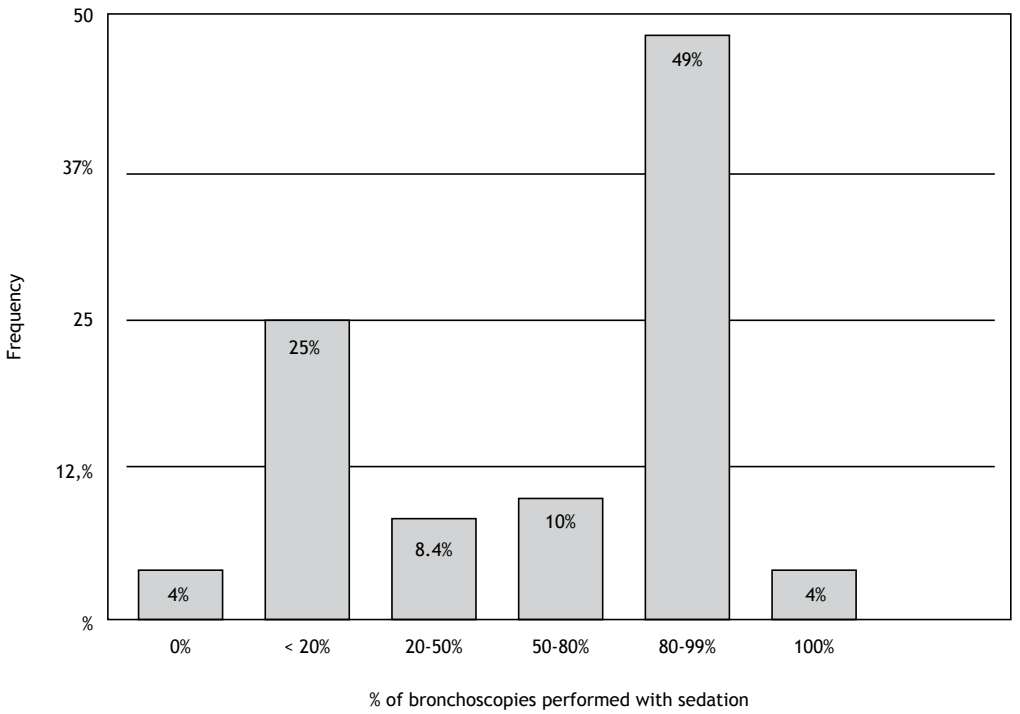

Figure 3. Proportions of bronchoscopies performed with sedation. 2016 survey of members of the Respiratory Endoscopy Section of the Latin American Thoracic Association.

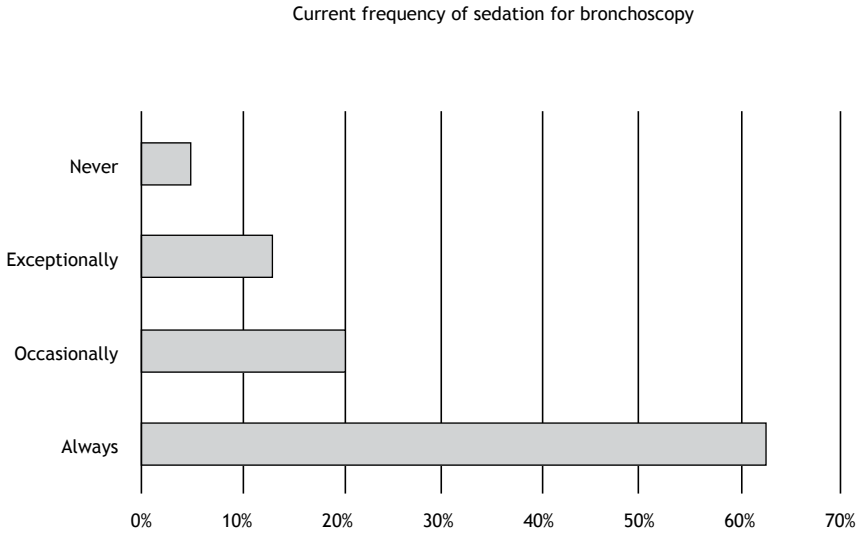

Figure 4. Current frequency of sedation for bronchoscopy. 2016 survey of members of the Respiratory Endoscopy Section of the Latin American Thoracic Association.

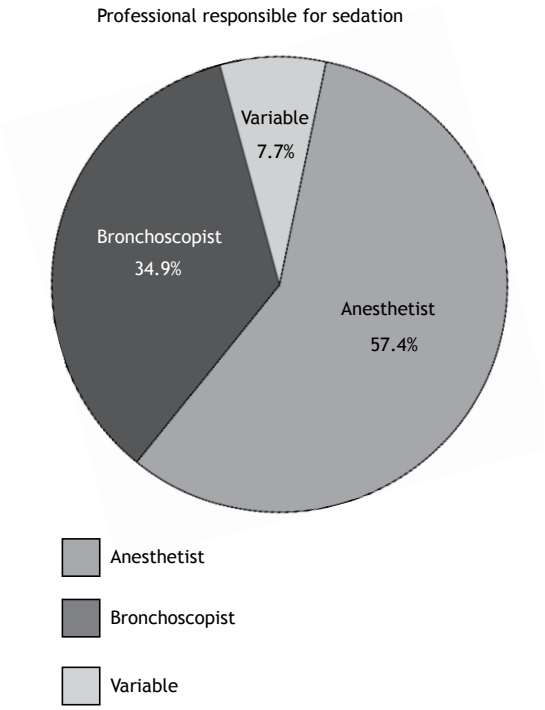

Figure 5. Professional responsible for administering sedation for bronchoscopy. 2016 survey of members of the Respiratory Endoscopy Section of the Latin American Thoracic Association.

as was the response that it was used on a regular basis (64.6% and 60.9%, respectively; $p < 0.05$). The proportion of respondents working at facilities at which an anesthetist was responsible for administering the sedation was higher among those working at private medical centers (69.2% vs. 52.5%; $p = 0.001$), as was that of those working at medical centers at which bronchoscopists performed deep sedation (6.5% vs. 0.7%; $p = 0.003$). In addition, benzodiazepine use was reported by fewer respondents working at private medical centers than respondents working at public medical centers (64.6% vs. 79.9%; $p = 0.006$), as was opiate use (24.8% vs. 46.6%; $p < 0.001$), although propofol use was comparable (59.3% and 50.0%, respectively; $p < 0.05$).

DISCUSSION

The number of endoscopic procedures and of the sedation practices associated therewith has grown exponentially in recent years.[8] The questionnaire employed in this survey was designed to obtain information on current practices in sedation for bronchoscopy, and well as on the general characteristics of bronchoscopy procedures performed in Latin America.

Most of our participants were male, were pulmonologists, and were based in South American countries, although a considerable number of respondents were working at medical centers in Mexico. Each region can have its sphere of influence and influencer. For example, bronchoscopists in Australia and New Zealand who were trained in the United Kingdom perform bronchoscopies from the front of the patient rather than from the back.[6]

Although most (62.5%) of our respondents held the opinion that sedation is always necessary during fiberoptic bronchoscopy, a subanalysis showed that the proportion of respondents who believed that such sedation is not required was higher among those who were ≥ 45 years of age. For this variable, we found no significant differences between genders or between private and public medical centers. Nevertheless, 4% of respondents stated that bronchoscopies are performed without sedation at their facilities, again with no significant difference between private and public medical centers.

At most of the medical centers surveyed in the present study, especially the private ones, an anesthetist was in charge of sedation for bronchoscopy and its monitoring. In 2012, Tozkoparan et al.[5] surveyed bronchoscopists in Turkey. The authors found that 36% of bronchoscopies were performed without sedation, that propofol was used in 21%, and that midazolam was used in 78%. They also identified differences among thoracic surgeons, anesthetists, and pulmonologists: anesthetists favored the use of propofol, whereas thoracic surgeons were the ones least likely to sedate their patients for bronchoscopy. The previously cited survey of bronchoscopy practices in Australia and New Zealand, conducted in 2013 by Barnett et al.,[6] produced similar results: 6% of bronchoscopies were performed without sedation; sedation was administered by an anesthetist at 81% of the private medical centers, compared with 38% of the public medical centers. The authors also found that 94% of the bronchoscopies involved the use of a two-sedative combination, the midazolam-fentanyl combination being the sedative of choice in 96% of the cases in which sedation was administered by a bronchoscopist and in 53% of those in which it was administered by an anesthetist, whereas propofol was used less commonly (in 4% and 55%, respectively). That same study showed that bronchoscopists administered the sedation in 45% of the procedures performed at public medical centers and in 19% of those performed at private medical centers.

In the present survey, ALAT-Endoscopy members reported performing bronchoscopies mainly in patients under conscious sedation, benzodiazepines being the drug of choice. These data are similar to those reported for countries outside Latin America, where there are also differences of opinion regarding whether or not bronchoscopy patients should be offered sedation, regarding the optimal type of sedation, and regarding the drugs that are the most appropriate.[4,9-12] In a study conducted in Italy in 2008, Facciolongo et al.[3] reported that 13.8% of bronchoscopists always administered sedation, 24.4% administered it frequently (in > 80% of bronchoscopies), and 60% administered it occasionally (in < 20% of bronchoscopies), the sedatives most often employed being midazolam and diazepam (in 70.7% and 23.6% of bronchoscopies, respectively). In a study conducted in 2010, Ni et al. reported that, in Taiwan, bronchoscopies were mainly performed with local anesthesia only.[13] The choice between conscious sedation and deep sedation seems to be an important one, given that deep sedation has been shown to be more cost-efficient for endobronchial ultrasound-guided transbronchial needle aspiration,[14] the use of which was reported by 32% of the respondents in the present survey.

Sedation performed by a bronchoscopist was deemed "safe" or "quite safe" by approximately two thirds of the ALAT members surveyed in our study. Approximately, one third of the respondents believed that the bronchoscopist should "always" or "almost always" be in charge of the sedation and another one third thought that the bronchoscopist should "never" administer the sedation. There was a consensus regarding the need for bronchoscopists to be trained in the use of sedation, which is significant because only approximately half of the questionnaires came from medical centers with resident training programs.

The results of the present survey reveal that, despite the advances in sedation techniques, drugs, and monitoring, there are still medical centers in Latin America where bronchoscopies are performed without sedation. That could be due to a lack of resources (human or material) or to medical idiosyncrasies. The fact that the proportion of physicians who believed that bronchoscopy does not require sedation was greater among those ≥ 45 years of age could be explained by a lack of experience with drugs used for short duration procedures, such as propofol,[9,15,16] remifentanil,[17,18] and dexmedetomidine,[19,20] which have been introduced relatively recently. The difference between younger and older physicians could also be a result of the fact that respiratory medicine training a few decades back was more focused on tuberculosis, whereas residents in respiratory medicine now receive training that focuses more on critical care.[21]

Switching the bronchoscopy procedure from the operating room to the endoscopy room is cost effective and does not sacrifice safety or patient satisfaction.[22,23] In addition, the development of a consensus in support of sedation being administered by non-anesthetists, in various scenarios,[24-28] paves the way for bronchoscopists to learn, practice, and take charge of patient sedation.[29,30]

Because propofol has a narrow therapeutic window,[28] most guidelines have recommended that it be administered only by specially trained professionals.[1,2] The use of propofol in bronchoscopy has been gaining ground: in 2002, it was not used at all in the United Kingdom[31]; and in 2010, it was used in only 4.1% of cases in Japan.[32] The previous controversy regarding the administration of propofol by non-anesthetists was mainly motivated by the fact that propofol has no antidote, by a fear of inducing sedation that is more profound than intended, and by the consequent risk to the patient.[28,33] The debate is over, and there are now numerous guidelines on and studies demonstrating the safety of sedation by non-anesthetists in digestive and respiratory endoscopy.[9-12,25,34-36] A number of studies have also shown that, for bronchoscopy, it is safe for nurses to administer propofol under the supervision of an endoscopist.[34,36] A clinical trial comparing propofol and midazolam for use in bronchoscopy showed that, with the appropriate training, non-anesthetists can safely administer propofol in outpatient settings.[35]

It is fundamental that non-anesthetists be qualified to manage any complications that may arise,[24,29,30,36-38] particularly in the respiratory tract.[38] The overwhelming majority of the respondents to this survey expressed their support for an ALAT-sponsored training program in sedation for bronchoscopy.

This study has some limitations. There are inherent methodological limitations to the use of questionnaires, including a possible memory bias and issues relating to the veracity of the data collected.[39] In addition, because we employed non-probability sampling, the number of participants per region or type of medical center might not be representative of that population. Furthermore, the survey was made available only to ALAT-Endoscopy members. It is likely that not all bronchoscopists in Latin America belong to ALAT, and those that do might not all belong to ALAT-Endoscopy. Moreover, participation was voluntary and not all members of ALAT-Endoscopy opted to participate. The fact that we did not get 100% participation might be due to a lack of interest or to difficulties in accessing the survey. However, the questionnaire was available online for four months and we sent several reminder e-mails. That four-month period and the multiple attempts to contact potential respondents, to improve the rate of participation, is standard in similar surveys.[40] By sending five reminder e-mails, we achieved a response rate of 70.3%, considerably higher than the 31% rate achieved in the study conducted in Australia and New Zealand,[6] in which only two reminder e-mails were sent. Another potential limitation is that we evaluated information provided by all participating bronchoscopists, rather than by hospital administrators or representatives. Therefore, the number of bronchoscopists might not have been equal to the number of medical centers. We also aimed to characterize the clinical practice of the individual bronchoscopists, rather than that of the medical centers. The information available might not be objective for several questions (number of beds, number of procedures, etc.), and some answers might not have been based on data. Other questions solicited opinions, which can be influenced by the work environment, personal experiences, etc. Health care systems and scenarios vary significantly, not only among Latin American countries but also among regions and cities within each country. Despite these limitations, we consider our results relevant to improving understanding of the current practices in sedation for bronchoscopy in Latin America, because we have shown that sedation for bronchoscopy is administered at many medical centers in Latin America, as well as that, although it is mainly administered by anesthetists, it is administered by the bronchoscopists themselves in a sizeable proportion of cases, and that bronchoscopy under sedation administered by a bronchoscopist is perceived (by other bronchoscopists) as being a safe technique if the bronchoscopist has been adequately trained.

Our findings show that, in Latin America, there is still a relatively high proportion of bronchoscopists (nearly 40%) who use sedation only occasionally or never. Given the intrinsic peculiarities of each region, it is essential for scientific communities and investigators, including those in Latin America, to generate scientific evidence of their own, to make region-specific recommendations regarding sedation for bronchoscopy, and to develop appropriate training programs for the professionals involved.

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