

Impact of multimedia information on bronchoscopy procedure: is it really helpful?

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Abstract:

AIM: In this study, we aimed to investigate the effect of written informed consent and comprehensive multimedia information on the anxiety level of patients, consumption of sedatives, difficulties during bronchoscopy, complications and duration of procedure.

METHODS: 150 patients undergoing bronchoscopy were included to this study. They were randomized into two groups Multimedia information group (MIG, $n = 75$) and written-informed consent group (WICG, $n = 75$). Signed written informed consent was obtained from all patients. Patients in MIG group watched comprehensive multimedia presentation. State anxiety scores of all patients were evaluated with State and Trait anxiety inventory (STAI-S).

RESULTS: STAI-S score of patients in MIG (40.31 ± 8.08) was lower than patients in WICG (44.29 ± 9.62) ($P = 0.007$). Satisfaction level was higher in MIG ($P = 0.001$). Statistically higher difficulties during "passage through vocal cords" and "interventions during bronchoscopy" were present in WICG group ($P = 0.013$ and $P = 0.043$, respectively). Total midazolam dose during bronchoscopy, and duration of bronchoscopy were statistically lower in MIG patients ($P < 0.001$ and $P = 0.045$, respectively). Difficulties during "waiting period", "passage through nasal/oral route", "applications of local anesthesia" and "complication frequency" were similar in both groups.

CONCLUSION: Besides reducing the state anxiety, multimedia information can reduce the dose of sedation, shorten the processing duration and reduce the difficulties during bronchoscopy.

Key words:

Bronchoscopy, ethics, multimedia information, sedation

Fiberoptic flexible bronchoscopy (FFB) is the most common type of diagnostic and therapeutic intervention that allows clinician for examining the tracheobronchial tree. FFB is also stressful and uncomfortable for patients.^[1] High levels of anxiety was reported usually in patients undergoing invasive procedures such as FFB.^[2] Anxiety may lead to increase in stress, increase in requirements for sedation and analgesics, decrease the procedure success and decrease in tolerance.^[3-5]

It is an accepted legal and ethical principle that physicians should obtain signed-informed consent form every subject before all interventions and treatments.^[3] Apart from this necessity information has been considered as an important factor in compliance to the procedure and reduction in situational anxiety.^[6] This information has been provided verbally as a component of informed consent for the procedure. Multimedia presentation may have a potential to overcome the deficiencies of verbal and written information. There are studies about beneficial effect on patient anxiety and knowledge when an information video was

included in the pre-procedural process.^[3,7,8] However, to our knowledge, previous studies did not evaluated whether the multimedia presentation had any effect on parameters important for the completeness and success of FFB, use of sedation, complications and duration of procedure.

In this study, we aimed to investigate the effect of written informed consent and comprehensive multimedia information on the anxiety level of patients, consumption of sedatives, difficulties during bronchoscopy, complications, and duration of procedure as primary outcomes.

Methods

After approval of study protocol by the local ethics committee of Afyon Kocatepe University, signed written informed consent was obtained from all subjects who were candidate for FFB. The present study was conducted as prospective, randomized and cross-sectional design in the bronchoscopy unit of Afyon Kocatepe University Hospital. Consecutive 150 patients older than 18 years of age were randomly assigned into

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two equal groups, multimedia information group (MIG) and written informed consent group (WICG). These subjects were divided into two groups via the sealed and numbered envelope technique randomly by Dr O. A. Bronchoscopists and anesthesiologists were not aware of the groups.

Demographic characteristics, preliminary diagnosis, appointment duration, previous history of bronchoscopy, and other experiences of endoscopic intervention (gastroscopy, colonoscopy) of all patients were noted. Difficulties during bronchoscopy, hemodynamic parameters (saturation, pulse rate, mean arterial pressure), complications, duration of procedure, sedation (midazolam), and local anesthetic (prilocaine) requirements were also recorded.

Patients younger than 18, patients in poor condition who were unable to cooperate, patients to whom bronchoscopy was contraindicated, patients who were illiterate, had neurological and psychiatric diagnoses or were using any anxiolytic drugs, patients who can read but did not sign the informed consent form, could not efficiently understand Turkish, and those who do not want to participate to this study were excluded from the study.

After randomization, all patients were asked to fill out the state anxiety part of State and Trait Anxiety Inventory (STAI-S). Then patients in MIG were informed initially with the Turkish written informed consent form for bronchoscopy procedure prepared by Turkish Thoracic Society. Then, the multimedia presentation (including visual, audio, video and animation) that was used in our previous study^[3] including the information for indications of bronchoscopy, application of procedure with a visual illustration and risks and benefits of procedure was shown to all subjects in the MIG. Subjects in WICG were informed only with Turkish written informed consent form for bronchoscopy. A chest physician (Dr. O.A.) also asked for medical support to make the patients really understand the written informed consent in both groups. Just after the completion of information for all subjects in both groups, patients were asked to fill out the questionnaire of STAI-S again.

State and Trait Anxiety Inventory (STAI) is a well-validated and widely used 40 items self-report questionnaire which assesses both state and trait anxiety. STAI consists of two separate parts each having 20 items. The first one is STAI-S (state anxiety) which intended to measure transitory anxiety at a specific time; the second is STAI-T (trait anxiety) which measures more stable long-term anxiety levels. In both sub-scales, each answer was scored on a scale of 1-4 (ranging from 'not at all' to 'very much so').^[3,4]

Satisfaction level of information types was evaluated with a liekert scale between 0-5 points (0: not at all satisfied, 5:highly satisfied).

To collect reliable data from all patients, no premedication including sedatives, local anesthetics or other drugs were given before all types of information. All bronchoscopy procedures were performed by two experienced bronchoscopists (Dr E.G. and Dr. S.S.U.) who were not aware of the randomization and types of information given. All premedications with

local anesthetics (prilocaine hydrochloride), sedative drug (midazolam), and bronchodilator drugs were applied after data collections. The level of sedation of the patient was determined at Ramsay scale of 2-3 by two experienced anesthesiologists (Dr. E.D.B. and Dr. S.K.) who were not aware of the randomization.

Statistics

The SPSS software version 20.0 (Statistical Package for the Social Sciences Inc, Chicago, IL, USA) was used for all statistical analysis. The Kolmogorov-Smirnov test was used to determine whether the variables were distributed normally or not. Continuous variables were expressed as mean (\pm) standard deviation (SD) or median (min-max.) according to distribution state. Nominal variables were expressed as percentage. Categorical variables were compared with Fischer exact-test or Chi-square test according to number of cases. Student's test or Mann-Whitney U test was used to compare parametric or nonparametric variables between the MIG and WICG, respectively. Multiple linear regression models were used to identify independent predictors of bronchoscopy duration for two groups. We conducted a post-hoc power analysis based on STAI-S score after information and it revealed study power as 0.85 (α value of 0.05 and effects size as: 0.44, with 75 patients in each group). (G Power 3 power analysis program).^[9] Statistically significance was set at P -value < 0.05 .

Results

Demographic data, preliminary diagnosis, experience, STAI-S scores and satisfaction level of 150 patients scheduled for FFB examination are depicted in Table 1. There was no difference between the groups in terms of characteristics of patients (age, gender) and preliminary diagnoses [Table 1].

Appointment duration for bronchoscopy, numbers of patients with previous experience of endoscopic interventions and number of previous bronchoscopy procedures were similar in both groups [Table 1]. STAI-S score of patients in MIG after information (40.31 ± 8.08) was significantly lower than patients in WICG (44.29 ± 9.62) ($P = 0.007$). Satisfaction level of information in MIG was significantly higher than the patients in WICG ($P = 0.001$) [Table 1].

When we analyzed the difficulties during bronchoscopy, higher difficulties during "passage through vocal cords" and "interventions during bronchoscopy" were present in WICG ($P = 0.013$ and $P = 0.043$, respectively) [Table 2].

Total midazolam dose during bronchoscopy, and duration of bronchoscopy were statistically lower in MIG ($P < 0.001$ and $P = 0.045$, respectively) [Table 3]. Hemodynamic parameters of patients (oxygen saturation, pulse rate, mean arterial pressure) were similar in both groups peroperatively [Table 3].

Linear regression model for duration of bronchoscopy for both groups were calculated as follows;

Duration of bronchoscopy for MIG (min) = $2.817 + \text{Age (years)} \times (-0.146) + \text{Appointment duration (day)} \times (0.240) + \text{Midazolam dosage (mg)} \times (2.027) + \text{Number of previous endoscopy} \times (-1.406)$

Table 1: Characteristics of the patients before bronchoscopy

Characteristics	WICG	MIG	P
Male, N (% within group)	52 (69.3)	49 (65.3)	0.601 [†]
Age, year	61.57±10.26	60.00±11.50	0.392 [‡]
Preliminary diagnosis			
Lung cancer	46 (61.3)	40 (53.3)	0.531 [†]
Tuberculosis	13 (17.3)	15 (20.0)	
Parenchymal disease	5 (6.7)	7 (9.3)	
Lung infection	4 (5.3)	5 (6.7)	
Others	7 (9.3)	6 (8.0)	
Appointment duration, days	3 (0–10)	3 (1–14)	0.593 [†]
Number of subjects with previous endoscopy experience, N (%)	11 (14.7)	9 (13.3)	0.631 [†]
Number of previous bronchoscopy procedure, median (min-max)	1 (1–3)	1 (1–4)	0.780 [†]
STAI-S score before information	45.05±9.52	45.39±7.89	0.642 [‡]
STAI-S score after information	44.29±9.62	40.31±8.08	0.007 [‡]
Satisfactions level	3.76±1.11	4.28±0.76	0.001 [‡]

[†]Chi-square test, [‡]Student's t-test, MIG = Multimedia information group, STAI-S = State and Trait Anxiety inventory—state anxiety subscale, WICG = Written informed consent group

Table 2: Difficulties reported by the patients during bronchoscopy

Difficulties	WICG	MIG	P
Waiting period	5 (6.7)	2 (2.7)	0.442 [†]
Local anesthesia with nasal spray (Xylocaine)	21 (28.0)	19 (25.3)	0.712 [‡]
Passing through the nasal or oral route	10 (13.3)	9 (12.0)	0.806 [‡]
Passing through the vocal cords	12 (16.0)	3 (4.0)	0.013 [†]
During examining both lungs	0	0	1.00 [†]
During applications of interventions (biopsy, lavage, brushing etc.)	4 (5.3)	0	0.043 [†]
No difficulties	39 (52.0)	47 (62.7)	0.187 [†]

[†]Fisher's exact test, [‡]Chi-square test, MIG = Multimedia information group, WICG = Written informed consent group

Duration of bronchoscopy for WICG (min) = 8.275 + Age (years) × (-0.001) + Appointment duration (day) × (-0.161) + Midazolam dosage (mg) × (1.377) + Number of previous endoscopy × (4.913)

Discussion

In this study, we found that not only state anxiety scores but also midazolam dose during bronchoscopy and duration of procedure were significantly lower in patients who were informed by multimedia presentation in MIG than the patients who were only informed only with written informed consent in WICG. Higher satisfaction level of information was present in MIG patients ($P = 0.001$). Nonetheless, higher frequency of difficulties during 'passage through vocal cords' and 'interventions during bronchoscopy' were present in patients receiving written information alone.

The provision of information before a medical or surgical procedure can improve postoperative recovery,^[10] reduce institutional anxiety.^[11] The ideal medium for the provision of preoperative information is still vague. Traditionally, this information has provided verbally by the clinician as

Table 3: Data of the bronchoscopy procedure for both groups

Data during bronchoscopy	WICG	MIG	P
Midazolam, mg	3.41±0.68	2.71±0.69	< 0.001 [†]
Diluted prilocaine, total syringe	5.25±1.18	5.19±1.44	0.756 [†]
Oxygen Saturation (SaO ₂), %			
before procedure	94.61±2.68	93.95±2.78	0.489 [†]
during procedure	91.73±4.88	91.80±4.86	0.933 [†]
after procedure	94.51±2.46	93.45±2.39	0.137 [†]
Pulse Rate, bpm			
before procedure	89.32±4.05	88.40 ±2.93	0.706 [†]
during procedure	103.16±14.42	104.88 ±17.11	0.507 [†]
after procedure	91.83±12.40	90.47±13.30	0.518 [†]
Mean Arterial Pressure, mmHg			
before procedure	87.72±16.64	85.13±12.30	0.279 [†]
during procedure	93.53±15.20	90.67±11.41	0.195 [†]
after procedure	86.15±14.15	84.82±12.07	0.537 [†]
Any complication	7 (9.3)	7 (9.3)	1.000 [‡]
Duration of procedure, min.	18.59±7.98	16.33±5.42	0.045 [†]

[†]Student's t-test, [‡]Chi-square test, MIG = Multimedia information group, WICG = Written informed consent group

a component of informed consent. Several studies have investigated using leaflets to develop and standardize the information taken by patients.^[12,13] But many patients do not read these forms exactly and do not fully understand the provided information. Electronic media such as audiotape, videotape are the good alternatives to overcome the deficiencies of information leaflets. Numerous studies that were comparing the efficiency of information with video/multimedia presentation on anxiety status of patients undergoing gastrointestinal endoscopy were found in the literature.^[8,14-16] In some previous studies no significant difference in the levels of anxiety between video and no video groups was reported.^[3,5,15] On the contrary, Luck *et al.*^[8] and Arabul *et al.*^[14] showed that information obtained by video presentation is more helpful than verbal information. In the present study anxiety scores of MIG was lower than WICG before bronchoscopy.

In the present study we found that midazolam dose during bronchoscopy was statistically lower in patients who were informed by MIG than the patients who were only informed with WICG. To the best of our knowledge, there is no previous study in the literature comparing the effects of information with written informed consent and multimedia presentation on anxiety levels, consumption of sedatives during bronchoscopy. Recently, in a study conducted in our hospital by Günay *et al.*, no significant difference was found in state anxiety scores between MIG and WICG after information.^[3] However, the impact of information types on sedation requirements and duration of procedure were not evaluated in that recent study.^[3] In the present study, significantly lower anxiety levels of patients after information may be related to the inclusion of the larger number of subjects than the previous study.^[3]

Bronchoscopy related anxiety may be due to concerns about physical discomfort caused by the invasive procedure itself besides the uncertainty of diagnosis, fear of unknown or unexpected.^[17-19] Anxiety may lead to lengthening of duration and make more difficult the application of standard procedure required for diagnosis (biopsy, bronchial washing,

transbronchial needle aspiration and bronchial brushing) and treatment.^[20] Prolongation of the processing time may lead to an increase not only in the difficulties during the application of procedure but also in the required sedative dose. Increase in the dose of sedation can lead to complications such as hypoxemia.^[21] Apnea and oxygen desaturation are the major safety concerns with the sedation during flexible bronchoscopy.^[22] In this study, higher difficulties during “passage through vocal cords” and “interventions during bronchoscopy” were seen in WICG. In addition to less sedation, processing time was shorter in MIG.

The incidence of oxygen desaturation was similar between the groups. Hemodynamic variables, such as heart rate and mean arterial pressure were tended to be lower in MIG, although the differences did not reach a statistically significant level.

Satisfaction scores of video information were evaluated in the previous literatures.^[3,5,14,15] They reported that visual information before an intervention had a significantly higher satisfaction level. Our results for satisfaction levels of patients after informing with a multimedia presentation were also in parallel with the previous studies.

In conclusion, besides reducing the state anxiety in patients undergoing bronchoscopy, multimedia information can reduce the amount of sedation used, shorten the processing duration and reduce the difficulties during bronchoscopy in adult population older than 18. Therefore, we believe that using multimedia information can decrease adverse effects of higher doses of sedation together with relaxing patients about the procedure. Last but not least multimedia information should be used more commonly in pulmonologists’ daily practice as a secondary outcome of the present study.

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