Nitrous Oxide and Laparoscopic Bariatric Surgery

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Introduction- The use of nitrous oxide (N2O) during abdominal surgery has been restricted due to concerns about its potential to distend bowel. N_2O is 30 times more soluble than nitrogen (N_2). When a patient is ventilated with N_2O it accumulates more rapidly in an air containing space than N_2 can be eliminated from that space into the blood. In a closed space, such as an obstructed bowel or pneumothorax, either the volume (if distensible) or the pressure (if non-distensible) of the space increases during exposure to N_2O.(1) The degree of the increase depends on the concentration of N_2O used, blood flow to the organ, and the duration of N_2O exposure. Surgeons frequently request that N2O not be used during abdominal procedures.(2-4) We studied whether surgeons could actually tell if N2O was or was not being used during laparoscopic bariatric surgery.

Methods- 50 patients who were either undergoing laparoscopic bariatric procedures were consented for the study. General anesthesia was provided using a combination of a volatile anesthetic and remifentanil as a continuous infusion. Patients were then randomly assigned to receive either air (group 1) or N2O (group 2) as a supplement to their anesthetic. FiO2 was maintained at 50% in both groups. The surgeon, who was blinded as to which study group the patient belonged, was asked at 30, 60 and 90 minutes whether surgical conditions were satisfactory and whether N2O was being used.

Results- There was no difference in demographic parameters or duration of surgery between groups. 25 patients received air in oxygen (group 1) and 25 patients received N_2O in oxygen (group 2). When asked at 30, 60 and 90 min after the start of surgery whether the patient was receiving N_2O or not the surgeons responded correctly 42%, 50% and 48%, respectively, which is equal to or less than would be expected by chance. Interestingly, in Group 2 patients the number of incorrect guesses was significantly higher than when air was used. Surgeons incorrectly answered that N_2O *was not* being used 88% of the time at 30 min, and 68% at 60 and 90 min in Group 2 (N_2O) patients.(Table). They also thought N_2O was being used in Group 1 patients (air) 28% (30 min), 32% (60 min) and 36% (90 min) of the time.

Discussion- Concern about its potential to expand normal bowel during surgery has caused many anesthesiologists to avoid using N_2O. We found that N_2O is not associated with obvious deleterious side effects during laparoscopic bariatric procedures. The decision whether or not to administer N_2O should be up to the anesthesiologist.

REFERENCES

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TABLE: At 30, 60 and 90 minutes after the start of surgery, the surgeon was asked if (N_2O) was being used.

	Correct Response	Incorrect Response
30 Min*		
Group 1	18 (72%) (no)	7 (28%) (yes)
Group 2	3 (12%) (yes)	22 (88%) (no)
60 Min *		
Group 1	17 (68%) (no)	8 (32%) (yes)
Group 2	8 (32%) (yes)	17 (68%) (no)
90 Min*		
Group 1	16 (64%) (no)	9 (36%) (yes)
Group 2	8 (32%) (yes)	17 (68%) (no)

Difference between groups* $P < 0.05$, Fisher's exact test