FIGURE The effects of carbachol (CCh), phenylephrine (Phe) and norepinephrine (NE) on resting tension and IP₁ accumulation of rat trachea (mean $\pm$ SE; $n=8$). Bq: becquerel, IP₁: inositol monophosphate, * $P < 0.05$, *** $P < 0.001$ vs 0.

between PI response and airway smooth muscle contraction stimulated by carbachol. However, neither phenylephrine nor norepinephrine could cause tracheal ring contraction in spite of increased IP₁ accumulation, suggesting that there is no direct relationship between PI response and airway smooth muscle contraction stimulated by α_1 -adrenoceptor agonists in rat trachea.

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IV butorphanol reduces analgesia but not pruritus or nausea associated with intrathecal morphine

To the Editor:

Intrathecal morphine provides excellent postoperative analgesia, but it is often accompanied by troublesome adverse effects, i.e., pruritus and nausea.^{1,2} Some investigators have reported that epidural butorphanol in combination with epidural morphine effectively reduces adverse effects without reversing analgesia.^{3–5} We tested the hypothesis that prophylactic *iv* butorphanol might reduce pruritus and nausea associated with intrathecal morphine.

In this randomized prospective double-blind pilot study, 20 patients undergoing total abdominal hysterectomy received spinal anesthesia with tetracaine 15 mg, and morphine 0.15 mg. Fifteen minutes after the administration of spinal anesthesia the patients received saline 1 mL *iv*, (Group A) or butorphanol 2 mg *iv*, (Group B). The intensity of pain, pruritus and nausea at three, five, seven and 24 hr after spinal anesthesia, the time of first request for additional analgesics (duration of analgesia), and the consumption of antipruritics and antiemetics were assessed.

The intensities of pain, pruritus and nausea are shown in the Table. The intensity of pain at three, five, and seven hours after spinal anesthesia in group B was significantly higher than that in group A. The duration of analgesia in group B (1126 ± 80 min) was significantly shorter than that in group A (1499 ± 159 min). There was no significant difference in the intensity of either pruritus or nausea or in consumption of antipruritic or antiemetic drugs between the groups.

Based on these preliminary results, we conclude that prophylactic *iv* butorphanol reduces analgesia but not pruritus or nausea associated with intrathecal morphine.

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TABLE Intensity of pain, pruritus and nausea (100 mm visual analogue scale score)

<i>Time (hr)</i>	<i>Pain</i>		<i>Pruritus</i>		<i>Nausea</i>	
	<i>Group A</i>	<i>Group B</i>	<i>Group A</i>	<i>Group B</i>	<i>Group A</i>	<i>Group B</i>
3	1.5 ± 0.8	15.3 ± 5.6*	0.8 ± 0.8	4.3 ± 3.9	1.5 ± 1.5	0.0 ± 0.0
5	3.0 ± 1.3	18.2 ± 6.7*	9.7 ± 3.2	4.6 ± 2.4	3.4 ± 2.9	0.3 ± 0.3
7	1.3 ± 1.3	7.6 ± 3.1*	3.7 ± 1.4	9.6 ± 7.0	0.9 ± 0.6	1.5 ± 0.9
24	16.4 ± 5.0	12.7 ± 4.0	10.0 ± 5.2	9.1 ± 4.6	0.0 ± 0.0	4.9 ± 3.4

Values are mean ± SEM.
**P* <0.05 when compared with group A using unpaired t test.

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4 Lawhorn CD, Brown RE Jr. Epidural morphine with butorphanol in pediatric patients. *J Clin Anesth* 1994; 6: 91–4.

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