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Autonomic nervous responses in colorectal polypectomy: Randomized controlled trial comparing air and carbondioxide insufflation

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Introduction: Air insufflation during colonoscopy to distend the colon lumen for viewing sometimes results in abdominal fullness and associated pain after colonoscopy as a result of overdistension or spasms of the colon. Worldwide, carbon dioxide (CO2) insufflation has become a good alternative for patients undergoing endoscopic examination because it is rapidly absorbed from the colon lumen, and is associated with less abdominal distension and associated pain.
However, almost all studies of CO2 insufflation in endoscopic examination used the visual analog scale (VAS) for analysis, with none reporting objective clinical examinations of autonomic nervous responses and cardiovascular tolerance.
Aim: In this prospective randomized controlled trial (RCT), we compared patient acceptance, cardiovascular tolerance, and autonomic nervous responses between patients receiving air insufflation and CO2 insufflation.
Methods: We initially enrolled 170 patients and, of these, 158 patients in total were analyzed (air group, 83; CO2 group, 75). Autonomic nervous responses were evaluated by analysis of heart rate variability (HRV). Primary end point was superiority in the effects of CO2 insufflation on the autonomic nervous system by HRV analysis.
Results: Visual analog scale disclosed significantly less abdominal pain and abdominal fullness with CO2. Percentage heart rate change rate at 1 h and 4 h after the procedure was also significantly lower in the CO2 group than in the air group (1 h after: $P < 0.01$, 4 h after: $P < 0.05$). Comparison based on age showed that % heart rate change was significantly lower in the younger CO2 patients (just after colonoscopy and 1 h after: $P < 0.01$, 4 h after: $P < 0.05$), but this difference was not apparent in an older group of patients.
Conclusions: This is the first RCT showing that colorectal polypectomy using CO2 insufflation significantly decreases abdominal pain and abdominal fullness common

in such patients with lowered stress to the autonomous nervous system. The effects using CO2 insufflation on the sympathetic nervous system also seemed to be more prominent among younger patients.