

A Motor-Driven Single-Use Colonoscope Controlled with a Handheld Device: A Feasibility Study in Volunteers

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Background: Colonoscopy is the method of choice for colorectal screening; compliance however has been hampered by patients' perception of a painful procedure often requiring sedation. We present the first results of a new single use colonoscope with inverted sleeve technology in asymptomatic volunteers, comparing two instrument generations.

Methods: 39 healthy asymptomatic volunteers (19 male, 20 female, mean age 50.3 years) underwent attempted total colonoscopy with a new colonoscope, the invendoscope SC40 (invendo medical GmbH, Weinheim, Germany); this single-use instrument consists of an endoscopic sheath with an electrohydraulic deflecting tip including camera, LED lighting and an inverted sleeve. Two instrument types (170 and 180/200 cm) were used in 28 and 11 cases. A 3.2mm working channel, air insufflation and flushing of optical lens are present. After standard colonic lavage preparation, the instrument was introduced and steered by a handheld device up to the cecum. I.v. injection of butylscopolmanine (20mg) was allowed, as were maneuvers of patient rotation and soft abdominal compression. Cecal intubation was documented by unequivocal photographs of appendiceal orifice or visualization of the ileocecal valve, or in exceptional cases, by a plain abdominal film.

Results: In 5 cases (type 1/2: 4/1 cases) there were different technical failures of the scope mechanisms preventing further progression in various parts of the colon. Of the 34 remaining examinations the cecum was reached in 28 cases (82%); the rates were 79% with the type 1 and 90% with the type 2 colonoscope. Of the failures, in two volunteers, passage beyond the sigmoid colon was not possible due to pain; one female volunteer had a gynaecological OP. The mean time to reach the cecum was 24 min with the type 1 and 20 min with the type 2 invendoscope. No major pathological findings were detected, and no complications occurred. Volunteers rated the examination on an overall score (1= no discomfort to 6=severe pain) at a mean of 1,7 points except for the two volunteers with failed sigmoid adhesion (pain score 5-6). No sedation was required in any case.

Conclusions: This new single-use colonoscope holds promise to achieve painless colonoscopy in the majority of cases with a reasonable cecal intubation rate. Further technical refinements improved its performance and will further do so up to the status of routine usability.