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Original article

Computed tomography-based virtual colonoscopy in the assessment of bowel endometriosis: The surgeon's point of view

Coloscanner avec coloscopie virtuelle dans le bilan préopératoire des endométrioses digestives : le point de vue du chirurgien

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ABSTRACT

Objective. – To discuss the role of computed tomography-based virtual colonoscopy (CTC) in preoperative assessment of bowel endometriosis.
Methods. – Retrospective study using data prospectively recorded, including 127 patients with colorectal endometriosis, having undergone CTC for bowel endometriosis. The study was conducted in a tertiary referral center during 38 consecutive months. Preoperative assessment included CTC, magnetic resonance imaging (MRI), endorectal ultrasound (ERUS) and clinical examination. Information concerning identification of deep infiltrating endometriosis (DIE) of the bowel, the length and height of colorectal involvement, stenosis of digestive lumen and associated digestive localizations were compared with intraoperative findings.
Results. – Sensitivity and specificity of CTC for DIE of the rectum, the sigmoid colon, associated digestive localizations, and stenosis of the digestive lumen were respectively 97% and 84%, 93% and 88%, 84% and 97%, 96% and 96%. Intraoperative estimation of the length of digestive tract involved by DIE was closer to that provided by CTC than those provided by MRI and ERUS. When CTC revealed stenosis of digestive lumen, higher rates of colorectal resection (63% vs. 9.6%, < 0.001) and disc excision (25.9% vs. 11%, 0.03) were recorded.
Discussion. – For those surgeons using various procedures for management of bowel endometriosis, accurate information on the length and height of bowel involvement, as well as the existence of bowel stenosis enables informed decision regarding the feasibility of conservative techniques versus bowel resection. Preoperative identification of associated localizations above the sigmoid colon is another major advantage related to CTC.
Conclusions. – CTC provides accurate data on the length and height of colorectal involvement by DIE, stenosis of digestive lumen and associated lesions of digestive tract, which impact on the choice of surgical procedure.

Mots clés :
Coloscanner avec coloscopie virtuelle

RÉSUMÉ

Objective. – Discuter le rôle du coloscanner avec coloscopie virtuelle (CSCV) dans le bilan préopératoire des endométrioses digestives.

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Échographie endorectale
Endometrioses colorectale
Endometrioses digestive.

Méthodes. – Étude rétrospective avec l'analyse des données recueillies de manière prospective chez 127 patientes avec endométriose digestive et ayant passé un CSCV au cours de 38 mois consécutifs dans un centre de référence de l'endométriose. Le bilan préopératoire comprenait également un examen clinique, une IRM, une échographie endorectale (EER). Les données radiologiques concernant l'identification de l'endométriose profonde, la longueur et la hauteur de l'infiltration, la sténose de la lumière digestive et les lésions digestives associées ont été comparées avec les données intraopératoires.
Résultats. – La sensibilité et la spécificité du CSCV pour le rectum, le colon sigmoïde, les lésions digestives associées et la sténose digestive ont été respectivement 97 % et 84 %, 93 % et 88 %, 84 % et 97 %, 96 % et 96 %. Les valeurs intraopératoires de la longueur de l'atteinte digestive ont été significativement plus proches de celles mesurées au CSCV. Les patientes avec sténose digestive au CSCV avaient un risque significativement plus élevé de résection colorectale (63% vs 9,6%, $<$ 0,001) et exérèse discoïde (25,9% vs 11%, 0,03).
Discussion. – Pour les chirurgiens qui utilisent plusieurs techniques de chirurgie colorectale pour le traitement de l'endométriose digestive, les informations fournies par le CSCV permettent d'anticiper la faisabilité des techniques conservatrices. L'identification des lésions digestives plus hautes est un autre avantage notable du CSCV.
Conclusions. – CSCV fourni des informations utiles concernant la longueur et la hauteur de l'infiltration digestive par l'endométriose profonde, la sténose de la lumière digestive et les localisations plus hautes, avec un impact direct sur la prise en charge chirurgicale des patientes avec endométriose digestive.

1. Introduction

In 2009, we introduced computed tomography-based virtual colonoscopy (CTC) in routine assessment of bowel endometriosis [1–3]. We believed that CTC would play a major role in the fine evaluation of the narrowness of digestive tract, the length of rectal wall involved by deep infiltrating endometriosis (DIE), the height of the rectal nodule from the anus and enables accurate identification of associated localizations of digestive tract. For those surgeons who choose to preserve the rectum, CTC data facilitate informed decision-making regarding the feasibility of rectal shaving [4]. Data provided by CTC also support the feasibility of rectal disc excision, which is directly related to the length and height of rectal involvement by DIE [5,6]. Information regarding bowel stenosis suggests the further risk of occlusive events in women with DIE and pregnancy intention prior to surgical management [7]. Last but not least, preoperative identification by CTC of associated lesions of digestive tract avoids any potential oversights by laparoscopy investigation. Furthermore, preoperative identification enables informed decision regarding the probability of multiple resections or excisions of digestive tract that could require use of diverting ileostomy. The LSD/MURO classification was recently proposed to structure a standardized reporting system for assessment of DIE using CTC, and to focus on the length (L) and height (D) of digestive tract involvement, stenosis of the lumen (S) and multiple digestive localizations (M) [2]. An increasing number of tertiary referral centers worldwide has introduced CTC in the routine assessment of DIE over the last few years [8–10].

The aim of our study was to retrospectively assess the accuracy of data provided by CTC for preoperative assessment of bowel endometriosis, and their association with the choice of surgical technique.

2. Methods

The present study was conducted between January 2010 and March 2013 and included all women undergoing CTC examination for preoperative assessment of deep endometriosis presumed to infiltrate the bowel.

In our daily practice, patients with presumption of DIE are routinely referred to our tertiary referral center (*Rouendométriose*) for advice and management either for pelvic pain or infertility. The patients are seen by a senior gynecologist, who performs clinical examination to check for DIE nodules of the vagina, the uterosacral ligaments (USL), the sigmoid colon, the rectum, the bladder or the ureters. For those patients with magnetic resonance imaging (MRI) not performed in our center, expert radiologists from our center reviewed imaging. When clinical examination and/or MRI revealed DIE, patients underwent endorectal ultrasound examination (ERUS) with the aim of assessing the depth of infiltration of the rectal wall. When infiltration involved at least the muscular layer, CTC was performed to estimate the stenosis of digestive lumen, the height of bowel infiltration measured from the anus, the length of infiltration of the colorectal wall, and to check for associated lesions of the colon or small bowel. On the basis of this information, the patient was seen a second time by a senior gynecologic surgeon (HR) who proposed the most appropriate surgical technique in each case and requested the patient's informed choice. The choice of surgical procedure, e.g. shaving, disc excision, colorectal resection or expectative management was made preoperatively. As preoperative assessment usually provides an accurate prediction of pelvis status, it is highly unlikely for the preoperative choice to be changed intraoperatively. Digestive tract lesions may not be removed in patients requiring rapid management by assisted reproductive technique (ART), in whom surgery is only justified by the management of ovarian endometriomas or hydrosalpinx. In this latter case, the rectum is simply freed by adhesiolysis.

CTC was performed in three facilities associated with *Rouendométriose* tertiary referral center: Rouen University Hospital, *Clinique de l'Europe* and *Clinique du Cèdre*. Protocols were similar for all three facilities. All patients underwent a reduced bowel preparation, which consisted of two doses of Normacol® (Norgine Pharma, France) the day prior to the procedure, and an antispasmodic agent immediately prior to gas insufflation to relieve colonic spasm and patient discomfort. Neither low-residue diet nor fecal or fluid tagging was necessary. No supplementary anesthesia was necessary during this procedure.

Colonic distension was achieved using automated CO_2 insufflation at a continuous gaseous pressure of 15–20 mmHg without exceeding 25 mmHg, after placement of a rectal catheter. Each patient underwent low-dose acquisition in prone position with no contrast enhancement followed by normal dose acquisition in supine position with IV contrast enhancement. Slice collimation was $\leq$ 3 mm with a reconstruction interval of $\leq$ 1.5 mm. Image