Appropiateness of colonoscopy in the university hospital center of monastir Interest and applicability of criteria established by the European panel on the Appropriateness of Gastrointestinal Endoscopy

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Pertinence des indications de la coloscopie dans le centre hospitalier de monastir. Intérêt et applicabilité des critères de l'European panel on the appropriateness of Gastrointestinal Endoscopy

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R É S U M É

Buts : 1) Evaluer l'application en pratique clinique des critères de pertinence établis par un panel européen EPAGE (European Panel on the Appropriateness of Gastrointestinal Endoscopy), 2) évaluer -sur la base de ces critères- la pertinence des indications de la coloscopie 3) et rechercher une éventuelle corrélation entre la pertinence de l'examen et le résultat endoscopique et/ou histologique de celui-ci.

Méthodes : Quatre cents quatre vingt sept coloscopies diagnostiques consécutives étaient inclues.

Résultats : Les critères de l'EPAGE I étaient applicables dans 86,4% des cas. La proportion des indications jugées appropriées, incertaines et inappropriées était respectivement de 51%, 14% et 18%. Le taux de 17% manquant représentait les coloscopies indiquées pour rectorragies mais qui n'avaient pu être classées dans l'un ou l'autre de ces groupes par défaut de renseignements cliniques. La probabilité de trouver une lésion pertinente à l'endoscopie était significativement plus importante chez les sujets âgés de plus de 50 ans, ceux de sexe masculin, ceux référés par un gastroentérologue, ceux dont la coloscopie était réalisée à titre hospitalier et ceux dont l'indication est jugée appropriée selon les critères de l'EPAGE I. Les variables indépendantes associées à la rentabilité diagnostique étaient l'âge, la pertinence de l'indication et le cadre hospitalier ou non de l'examen.

Conclusion : Les critères de pertinence de l'EPAGE I sont donc applicables à notre pratique clinique dans 86,4 % des cas et sont corrélés à la découverte endoscopique de lésions pertinentes. Ils permettent ainsi de rationnaliser le recours aux examens endoscopiques. Toutefois, ils doivent être régulièrement mis à jour.

M o t s - c l é s

Colonoscopy, Indications, expert panel, Appropriateness, RAND appropriateness method, Diagnostic yield.

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S U M M A R Y

Aim : 1) To assess the applicability of EPAGE criteria in there first version (EPAGE I) in clinical practice, 2) to assess colonoscopy appropriateness using EPAGE I criteria, 3) to compare colonoscopy appropriateness and findings.

Methods : Four hundred and eighty-seven consecutive diagnostic colonoscopies were included. The appropriateness of the indication of colonoscopy was appreciated using a scoring system on the basis of the EPAGE criteria in there first version (EPAGE I).

Results : Appropriateness were applied in 86,4% of the colonoscopies. Fifty-one percent were appropriate, 14% uncertain and 18% inappropriate. The difference of 17% represented the procedures indicated for hematochezia and for witch an appropriateness score can not be attributed because of lack of clinical information. The probability of finding a clinically significant lesion was significantly higher in patients aged ≥50 years, males, inpatients, those referred by gastroenterologists and those who had the colonoscopy for "appropriate" indication according to the EPAGE I criteria. The independent variables correlated with the diagnostic yield of colonoscopy were the age, the appropriateness of indication and the health care setting.

Conclusion : EPAGE I criteria were applicable in most patients and were correlated with significant findings. They are thereby useful to rationalize colonoscopy demand. However, they could be regularly updated.

K e y - w o r d s

Colonoscopy, Indications, expert panel, Appropriateness, EPAGE, Diagnostic yield.

الدواعي الملحة لإجراء تنظير القولون بمستشفى المنستير

الباحثون : أ. هلاّرا – ع. دبابي – ن. بن شعبان – و. بن منصور – هـ. لغماري – و. مالكي – ف. بديوي – ل. صفر – ح. صفار

الكلمات الأساسية: تنظير القولون – دواعي الإستعمال – تشخيص

Colonoscopy is the most commonly performed procedure for the diagnostic and treatment of lower digestive tract diseases as well as screening for colorectal cancer.

Considering the increase of demand for gastrointestinal endoscopy and then the need of rational use of such procedure, adherence to its appropriate indications became crucial and essential. Appropriateness is defined to mean that the expected health benefit exceeds the expected negative consequences (risks) by a sufficiently wide margin that the procedure is worth performing. Sets of appropriateness criteria have been proposed first in the eighties with the RAND method consisting on a literature analysis followed by experts' synthesis then a reduction of propositions for recommendations. Then, the European Panel on the Appropriateness of Gastrointestinal Endoscopy (EPAGE) and several other experts panels have developed guidelines for appropriate referral of both upper and lower gastrointestinal endoscopy. Assessment of these criteria has usually concerned the indications of gastroscopy but rarely those of colonoscopy.

The present retrospective study aimed to:

assess the applicability of the EPAGE criteria of appropriateness of the indications of colonoscopy (first version) in clinical practice

assess the appropriateness of the colonoscopies performed in the endoscopy unit of the university hospital center of Monastir referring to these criteria

check whether there is a correlation between appropriateness of colonoscopy and appropriateness of its endoscopic and or histological findings.

PATIENTS AND METHODS

The study concerned all consecutive diagnostic colonoscopic procedures undertaken in the endoscopy unit of the department of gastroenterology of the university hospital center of Monastir, from January 2005 to December 2005. Data concerning patients and procedures were collected retrospectively through the use of colonoscopic and eventually histological reports. Patients characteristics examined included demographics, personal and familial history, risk level for CRC and results of previous gastrointestinal procedures. Doctor-related information (specialty and health care setting) were also collected. Colonoscopy characteristics examined included the indication for a colonoscopy, the appropriateness rating for that indication and a significant diagnostic.

The indication for endoscopy and the corresponding appropriateness were determined according to the Europeen Panel of the Appropriateness of Gastrointestinal Endoscopy (EPAGE) software in its first version -established on 1999 – www.epage.ch.

If a patient has more than one indication for a colonoscopy, the indication having the higher appropriateness score was considered. The indication was considered: "appropriate" (A) if the panelists' rating ranged between 7 and 9, "inappropriate" (I) if it ranged between 1 and 3 and "uncertain" (U) if it ranged between 4 and 6 or in case of disagreement. Disagreement was defined as occurring when at least two panelists rated an indication from 1to 3 and two others from 7 to 9.

A forth item was added (NA) corresponding to the indications for which the EPAGE I criteria were not applicable.

Colonoscopic findings were divided in 5 categories: normal endoscopy, polyp, tumor, inflammation and others (diverticula, angiodysplasia, hemorrhoids, extrinsic stenosis). Inconclusive, incomplete procedures or those cancelled immediately because of a bad quality of preparation were excluded from this classification.

Histological findings were divided in 6 categories: non adenomatous polyps, adenomatous polyps, cancer, inflammatory colitis or ileo-colitis, rectal ulcer and others.

In the absence of consensual definition, we considered as *relevant (or significant) findings* those having therapeutic or prognostic consequences. The presence of any of the following lesions was considered as a significant finding on colonoscopy: adenomatous polyps or colorectal cancer, inflammatory bowel disease (IBD) (either newly diagnosed or a more precise diagnosis or determination of the extent of the disease that influenced immediate management of the disease), other colitis (infectious, ischemic, eosinophilic, microscopic), angiodysplasia, non tumoral stenosis, rectal ulcer and complicated diverticulosis. The following were not considered as significant findings: normal colonoscopy, hemorrhoids, anal fissures, previously established IBD, uncomplicated diverticulosis, and nonadenomatous polyps.

If the endoscopy revealed two lesions or more, the most relevant was considered.

The diagnostic yield (DY) of colonoscopy was defined as the ratio between the number of colonoscopies revealing relevant findings and the total number of colonoscopies performed.

Statistical analysis

Data were processed and analyzed with SPSS version 11.0 software package. Categorical variables were compared by means of the chi-square test. A P-value of <0.05 was considered to indicate a statistically significant difference. Univariate analysis and multivariate analysis using multiple variable logistic regression were used to determine factors associated with relevant findings.

RESULTS

During the study period, 487 consecutive diagnostic colonoscopies were performed. There were complete colonoscopies-reaching the caecum- in 78.9% of the cases. Of them, there were 108 ileo-colonoscopies.

There were 266 women and 221 men (sex-ratio=0.83) with a mean age of 51.7 years [13-86 years]. Of them, 55.5% were ≥ 50 years old.Overall, 78% were reffered by gastroenterologists, 20% patients by other specialists and 2% by general practice doctors. There were 55.2% outhospital patients.

Most colonoscopies were indicated for hematochezia (14.6%), followed by anemia (12.5%) and then abdominal pain and bowel disorder ***(table1).***

Table 1: Indications for colonoscopies

Indications	Numbre	(%)
Indications established by l'EPAGE I	421	(86,4)
Iron deficiency anemia	61	(12,5)
hematochezia	71	(14,6)
Abdominal pain with or without bowel disorder	52	(10,7)
Change in transit mainly constipation	55	(11,3)
Unexplained diarrhea	52	(10,7)
Evaluation of khnown ulcérative colitis	19	(3,9)
Evaluation of khnown crohn disease	11	(2,3)
Screening of CCR in patients with khnown ulcérative colitis	3	(0,6)
Screening of CCR in patients with khnown crohn disease	1	(0,2)
Surveillance after polypectomy or curative surgery of CCR	17	(3,5)
Screening of CCR in asymptomatic chez des sujets asymptomatiques	5	(1)
Lésion in barium enema	4	(0,8)
Lésion in recto-sigmoïdoscopy	31	(6,4)
Preoperative coloscopy	6	(1,2
Acute diverticulitis	2	(0,4)
Unexplained weight loss	31	(6,4)
Others indications than those established by EPAGE I	66	(13,6)
Total	**487**	**(100)**

Screening colonoscopies (in patients with known IBD or in asymptomatic patients) represented only 1.8% of the overall indications.

Applicability of the EPAGE criteria

EPAGE I criteria were not applicable in 66 colonoscopies (13.6%) because the indication did not correspond to any of the EPAGE defined clinical scenarios. They were essentially procedures performed:

• to search for a primary tumor in patients with metastatic adenocarcinoma (n= 11) or exudative ascitis (n=11)
• to explore melena in patients with normal gastroscopy (n=9)
• to search for a gate way infectious in patients with sepsis, endocarditis or psoas abscess (n=6)
• in the assessment of lymphoma (n=3)
• others scenarios

The EPAGE I criteria were applicable for 421 patients (86.4%). The colonoscopy was considered to be appropriate in 51%, uncertain in 14% and inappropriate in 18%. The difference of 17% represent the procedures performed for "hematochezia" and for which a rate of appropriateness was difficult to establish because of lacking clinical data about the color of lost blood; bright or dark red.

Appropriateness of colonoscopies

Indications and appropriateness:

Anemia was the major indication (22.8%) in the appropriate colonoscopies group. Indications considered as uncertain were predominantly represented by abdominal pain with or without bowel disorder (32.2%). Inappropriate colonoscopies corresponded essentially to unexplained chronic diarrhea or constipation with no previous lower gastrointestinal evaluation respectively in 29 and 22.3% of the cases.

Characteristics of patients and colonoscopy appropriateness:

In the appropriate procedures group, patients were significantly older (p<0.001).

The sex ratio (women/men) was significantly higher in the inappropriate group compared with two others groups (appropriate and uncertain) p= 0.01.

Inpatients and those referred by gastroenterologists wore more likely to have an appropriate or uncertain indication when compared respectively to outpatients and those referred by other specialists or general practice doctors.

Endoscopic and histological findings

Of the 427 conclusive colonoscopies, 234 (54.8%) were macroscopically normal. However, thirteen presented histological abnormalities. They were procedures performed to explore chronic diarrhea in which biopsies were systematically undertaken. Then, 221 colonoscopies were effectively (macroscopically and microscopically) normal. Relevant findings were detected in 148 of the remaining 206 procedures. The diagnostic yield (DY) of colonoscopies was then 34.6%. A colorectal cancer was diagnosed in 21 cases (**table 2**). Adenomatous polyps were detected in 54 endoscopies (familial adenomatous polyposis in 2 cases).

Table 2: Relevant findings on colonoscopy

Relevant findings (procedures number: n =148)
- Colorectal cancer : n= 21
- Adénoma : n= 54 procedures
Hamartomatous rectal polyposis : n=1
- Crohn disease (either newly diagnosed or a more precise diagnosis or determination of the extent of the disease) : n=21
- Crohn disease considered initially as UC and the diagnostic of which was reconcidered after this colonoscopy: n=4
- UC (either newly diagnosed or a more precise diagnosis or determination of the extent of the disease): n=10
- Microscopic colitis : n= 9
- Infectious Colitis : n= 4 (two ileocecal tuberculosis)
- Ischemic colitis : n=3
- Rectal ulcer : n=8
- Angiodysplasia : n=11
- Non tumoral stenosis : n=1
- Complicated diverticulosis : n=1

Correlation between appropriateness of colonoscopies and findings

Positive findings were more likely detected in the appropriate colonoscopies group than uncertain and inappropriate groups (p=0.002). Colorectal cancers were significantly more often diagnosed in the appropriate group than in the uncertain and inappropriate groups (15 versus 0 and 1) (p=0.006). Two CCR were however detected in endoscopies for which EPAGE I criteria were not applicable. Adenomatous polyps were also more often found in appropriate group than the others groups but the difference was not significant (p=0.1).There was also a non-significant predominance of large-sized adenomas (≥1cm) in the appropriate group (p=0.1). In terms of villous component, high grade dysplasia and advanced adenomas, there was no

Table 3: Relevant findings and diagnostic yield of colonoscopy according to the appropriateness of indications

Appropriateness of colonoscopy indications according	Number of patients 191	Number of normal colonoscopies, n(%)	Number of colonoscopies with relevant findings, n	Diagnostic yield	
Appropriate indication	53	88(46,1)	80	41,9%	36%
Uncertain indication	67	32(60,3)	8	15,1%	
Inappropriate indication	55	45(67,1)	17	25,3%	
Hematochezia	61	22(40)	19	34,5%	
EPAGE criteria not applicables	427	34(55,7)	24	39,3%	
Total		221(51,7)	148	34,6%	

significant difference between the three groups of appropriateness.

The **table 3** illustrates the diagnostic yield of colonoscopies according to the appropriateness of their indications. A higher DY was found in the appropriate group compared to the uncertain and inappropriate groups (41.9% versus 36% and 25.3%). The DY of procedures performed for hematochezia was similar to the global DY of overall procedures. Even when the EPAGE I criteria were not applicable the DY of colonoscopies was significant (39.3%).

Determinants of the diagnostic yield

Table 4 shows the association between selected clinical parameters and the diagnostic yield of colonoscopy. The probability of finding a clinically significant lesion was significantly higher in patients aged ≥50 years, males, inpatients, those referred by gastroenterologists, and those who had the colonoscopy for "appropriate" indication. After adjustment for the other variables, age of patients, appropriateness of indications for colonoscopy according to the EPAGE I criteria and referrals by gastroenterologist were the independent parameters associated with the diagnostic yield.

DISCUSSION

To our knowledge, this is the first study in Tunisia to assess the appropriateness of colonoscopy and to determine the diagnostic yield according to the EPAGE I criteria. According to this study, EPAGE I were applicable in our clinical practice in 86.4% of cases. In that situation, the indications were considered to be appropriate, uncertain or inappropriate respectively in 51%, 14% and 18%. The difference of 17% corresponded to colonoscopies indicated for "hematochezia" and for which a rate of appropriateness was difficult to establish because of lacking clinical data about the color of lost blood; bright or dark red.

There was a positive correlation between the appropriateness of colonoscopic findings and the appropriateness of their indication with reference to EPAGE I criteria. These results suggest that using these criteria may improve our endoscopic practice and then quality of health care.

The rate of 51% for appropriate indications seems to be little but, it is similar to those reported in different studies [1, 2, 3, 4, 5] (**table 5**). The rate of 18% of inappropriate colonoscopies in our patients represents a mean rate compared to results described in the literature. In fact, this rate is higher than those reported by Kmieciack et al [1], Terraz et al [2] and Denis et al [5] but, it was lower than those reported by Vader et al [4] (**table 5**). Our result (18%) may be distorted because of the number of procedures undertaken for "hematochezia" and or due to the retrospective type of the study. It may also indicate a larger access to colonoscopy in our department or even in our country or may reflect geographic variability.

About the indication "hematochezia", the EPAGE I criteria separated bright red bleeding -which reflects a low anorectale lesion- and maroon bleeding which reflects a colonic lesion.

Table 4 : Patients characteristics, colonoscopies' appropriateness and diagnostic yield

Patients Characteristics	Number of patients	Number of colonoscopies with appropriate indications, n(%)	Number of normal colonoscopies, n (%)	Number of colonoscopies with relevant findings	Diagnostic yield	P
Age						
• < 50 years	199	73(36,7)	112(56,3)	50	25,1%	<0,001
• ≥ 50 years	228	118(51,7)	109(47,8)	98	43%	
Sex						
• Male	194	90(46,4)	89(45,9)	80	41,2%	0,009
• Female	233	101(43,3)	132(56,6)	68	29,2%	
Referring doctor						
• Gastroenterologist	335	154(46)	161(48)	124	37%	0,05
• Other	92	37(40,2)	60(65,2)	24	26,1%	
Health setting						
• In-patients	200	92(46)	83(41,5)	84	42%	0,002
• Out-patients	227	99(43,6)	138(60,8)	64	28,2%	
Total	427	191(44,7)	221(51,7)	148	34,6%	

Table 5: Appropriate indications of colonoscopies based on EPAGE I criteria: a literature review

	Kmieciak et al [1]	Terraz et al [2]	Letonturier et al [3]		Denis et al [6]	Vader et al [5]	Our study	
			UCH	HC				
A (%)	54	59	57	54	59	46	51	+17*
U (%)	40	28	NS	NS	31	27	14	
I (%)	6	13	NS	NS	10	27	18	

* Indication « hematochezia » not assessed NS : not specified
CHU: University Center Hospital CH: Hospital Center
A: appropriate U: uncertain I : inappropriate

Table 6: Rate of normal colonoscopies: littérature review:

	Kmieciak et al 2001 [1]	Denis et al 2004 [6]	Grasset et al 2000 [8]	Bernard et al 2006 [9]	Chan et al 2006 [10]	Froehlich et al 1998 [5]	Our study 2005
Total number of colonoscopies	436	500	840	5069	380	553	427
Rate of normal colonoscopies (%)	57	54	51	46,5	65,5	51,3	51,7

But, the description of the color of rectal bleeding is a semiological nuance that is difficult to clarify when interviewing the patients, it remains a subjective data. In our clinical practice, we use rather the expression "rectal bleeding" ("rectorragies") to describe any red bleeding exteriorized through the anus whatever it is bright or dark red.

The rate of normal procedures in our study (51.7%) seemed to be high but, in fact, it was no different as compared to the rates reported in the literature [1,4, 6, 7, 8] (**table 6**). The diagnostic yield of colonoscopies (34.6%) was also similar to the results of Balguer et al (37%), Denis et al (32%), Morini et al (30%). It was, however different from those of Burnad et al, Buyse et al, Grassini et al, Froehlich et al [1, 5, 7, 9-16] (**table 7**). In fact, this variability of the diagnostic yield depends, in one hand, on the appropriateness criteria on which studies were based (EPAGE, ASGE, others) and in the other hand, on the variability of the non consensual definition of relevant findings (**table** 7).

There were limitations to our study. Firstly, it was retrospective, then there were some lacking data making difficult the application of EPAGE criteria having a prospective vocation. On the other hand, although our study is the first Tunisian research evaluating the appropriateness of colonoscopy according to the EPAGE I criteria in an endoscopic unit; it was carried before the validation of EPAGE II criteria in 2009. Many studies evaluating EPAGE II criteria have shown that they decrease the inappropriate rate and the possibility of the overlooking potentially severe lesions (17, 18). Prospective studies are so interesting to undertake especially assessing the appropriatness of colonoscopies according to EPAGE I and EPAGE II criteria.

Nevertheless, there are some strong points as the study included a large number of patients in a short period which implicates the performance of colonoscopies by an homogenous group of endoscopists and the stability of appropriateness referentials used.

Table 7: Diagnostic yield of colonoscopy in different studies

	Appropriateness criteria	Diagnostic yield
Balaguer et al [11]	EPAGE	37%
Burnand et al [9]	EPAGE	14.4%
Denis et al [4]	EPAGE	32%
Buyse et al [12]	EPAGE	14.8%
Galmiche et al [6]	EPAGE	36%
Kmieciak LG et al [1]	EPAGE	43%
Bersani et al [13]	ASGE	25.4%
Morini et al [14]	ASGE	30%
Siddique et al [15]	ASGE	27.2%
De Bosset et al [16]	Swiss criteria RAND/UCLA	23.8%
Grassini et al [17]	ASGE+ SIED	24.5%
Froehlich et al [18]	Swiss criteria RAND/UCLA	43.9%
Our study	EPAGE	34.6%

In conclusion: EPAGE I criteria were applicable in most patients and were correlated with significant findings. The appropriateness criteria established by the EPAGE I are effectively helpful for clinical decisions but there cannot substitute the doctor reflection. Diagnostic Yield was significantly higher in patients aged ≥50 years, males, inpatients, those referred by gastroenterologists, and those who had the colonoscopy for "appropriate" indication. When these criteria were not applicable, some relevant findings could be diagnosed. We suggest a nationalization of endoscopic appropriateness criteria, with regard to our epidemiology. Eventually, we can propose an educational program about the appropriateness criteria of different diagnostic and therapeutic health procedures to general practice doctors and specialists.

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