Quality indicators for colonoscopy in a Tunisian endoscopy unit

Indicateurs de qualité d'une coloscopie dans une unité d'endoscopie Tunisienne

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RÉSUMÉ
Prérequis: La coloscopie est l'examen de référence pour la prévention et le dépistage du cancer colo-rectal. Ces objectifs sont largement dépendant de la qualité de la procédure, dont les principaux indicateurs sont le taux de détection de polypes et d'examens complets. Le but de cette étude était de déterminer les facteurs associés à ces deux indicateurs de qualité à partir des coloscopies réalisées dans notre unité.
Méthodes : Etude rétrospective incluant toutes les coloscopies réalisées entre Janvier 2009 et Mars 2013. Nous avons précisé : les indications, le taux d'examens complets (intubation caecale) et les motifs de son échec, la qualité de la préparation et le taux de détection de polypes. Les facteurs associés à la détection de polypes et à l'échec d'un examen complet ont été étudiés. Le seuil de signification était fixé à 0,05.
Résultats : Nous avons colligé 859 coloscopies sans sédation pour des patients âgés en moyenne de 54.76 ± 17.5 ans avec 50,2% d'hommes. Les indications de la coloscopie étaient dominées par les signes d'alarme (40%). La coloscopie était totale dans 525 cas (61,1%). La préparation était jugée bonne dans 24%, moyenne dans 61% et mauvaise dans 15%. En étude univariée, l'échec était essentiellement en rapport avec une mauvaise préparation (bonne vs moyenne ou mauvaise (67,2 % vs 31,3%, p = 0,0001,OR: 4,5, 95% CI: 3,3-6), la présence de signes d'alarme (55% vs 43%, p=0,04; OR: 1,1, 95% CI:0,9-2,5) et une coloscopie de dépistage (72,9% vs 60,1%, p=0,03, OR: 1,7, 95% CI: 1-3). En étude multivariée, les facteurs associés à un examen complet éteint la qualité de la préparation (p=10-3, OR=2,23, 95% CI: 1,47-3,3) et l'indication de dépistage (p=0,02, OR: 1,9, 95% CI: 1,1-3,4). Des polypes ont été détectés chez 179 patients (21%). En étude univariée, le sexe masculin (25,1% vs 16,8%, p=0,001, OR:2,36, 95% CI: 1,4–4), l'âge supérieur à 47 ans (p=10-3, OR:3,2, 95 % CI:2-4,9), l'indication de la coloscopie pour dépistage (35,7% vs 19%, p=0,001 OR: 2,36, 95% CI: 1,4–4), la présence d'un cancer colorectal (50,9% vs 18,2%, p = 0,0001, OR: 4,6, 95% CI: 2,6-8) et la qualité de la préparation (26,5% vs 19,1%, p=0,03 OR:1,4, 95% CI:0,9 –2) étaient les facteurs corrélés au taux de dépistage de polypes. L'étude multivariée a montré qu'un âge supérieur à 47 ans (p=10-3, OR: 3,5 95% CI:2-5,9), la qualité de la préparation (p=10-3 OR=5, 95% IC:2,7-9,6) et l'endoscopie de dépistage (p=0,01, OR 2,5, 95% IC 1,4-4,7) étaient significativement associés au taux de dépistage des polypes.
Conclusion : La qualité de la coloscopie dépend de plusieurs facteurs, aussi bien avant que pendant la procédure. Dans notre cohorte, la préparation colique, la tolérance de l'examen, l'âge et l'indication de la coloscopie étaient les facteurs significativement corrélés à la qualité de la coloscopie. La préparation et la tolérance sont des cibles accessibles sur lesquelles il faut agir pour améliorer les performances.

Mots-clés
endoscopie, coloscopie, indicateurs de qualité

SUMMARY
Background: Colonoscopy is a powerful tool for prevention and early diagnosis of colorectal cancer. However, the effectiveness of colonoscopy is dependent on the quality of the procedure, which is assessed by a number of key quality indicators. Among them, cecal intubation and adenoma detection rate are historically the most commonly used indicators of quality of colonoscopy. The aim of our study was to evaluate these two indicators of quality of colonoscopy in a Tunisian endoscopy center.
Methods : We conducted a retrospective study from January 2009 to March 2013. Data were collected from colonoscopies reports. Demographic data, indication of the procedure, and endoscopic diagnosis were collected. The quality of bowel preparation was subjectively classified at the time of the examination by each endoscopist as good, fair, or poor. Procedure related quality indicators considered for analysis were: cecal intubation rate (CIR) and polyp detection rate.
Results: During the period of the study, 859 colonoscopies were performed without sedation. The average age was 54.76 ± 17.5 years. Males represented the majority of our population (50.2%). Colic preparation was judged good, fair and poor in respectively 24 %, 61% and 15% of cases. The cecal intubation rate was 61.1 %. Causes of incomplete colonoscopy were especially poor preparation (47.3%) and poor tolerance (34.4%). Univariate analysis disclosed 3 predictive factors of CIR : the quality of bowel preparation (good vs fair or poor(67.2 % vs 31.3%, p = 0.0001,OR: 4.5, 95% CI: 3.3-6), the screening indication (72.9% vs 60.1% , p = 0.03, OR: 1.7, 95% CI: 1-3) and the presence of alarming signs (55% vs 43%, p=0.04; OR: 1.1, 95% CI:0.9-2.5). By multivariate analysis, the factors influencing independently the CIR were the quality of bowel preparation (p=10-3, OR=2.23, 95% CI: 1.47-3.3) and the screening indication (p=0.02, OR: 1.9, 95% CI: 1.1-3.4). The polyp detection rate was 21% and was correlated, in univariate analysis with: age over 47 years (p=10-3, OR:3.2, 95 % CI:2-4.9), male gender (25.1% vs 16.8%, p=0.001, OR:2.36, 95% CI: 1.4–4), the quality of the preparation (26.5% vs 19.1%, p=0.03 OR:1.4, 95% CI:0.9 –2), the presence of colorectal cancer (50.9% vs 18.2%, p=0.0001, OR:4.6, 95% CI: 2.6-8) and the screening indication (35.7% vs 19%, p=0.001 OR: 2.36, 95% CI: 1.4–4). By multivariate analysis, 3 independent factors associated with polyp detection rate were identified: age over 47 years (p=10-3, OR: 3.5 95% CI:2-5.9), bowel preparation (p=10-3 OR=5, 95% IC:2.7-9.6) and the screening indication(p=0.01, OR 2.5, 95% IC 1.4-4.7).
Conclusion: In our cohort, the quality of bowel preparation, tolerance of the procedure, age and the indication of colonoscopy were significantly associated with the indicators of quality. Bowel preparation and tolerance are targets on which we should act to improve performance.

Key-words
Endoscopy; colonoscopy; quality indicators.

Colonoscopy is a very common procedure performed to investigate colonic symptoms and screen for cancer and polyps [1]. In the last decade, there has been increasing attention on the quality of colonoscopy, especially in the context of colorectal cancer screening where there is potential for causing harm to otherwise healthy people [2,3]. Several quality indicators have been identified which are readily measurable and associated with improved patient outcomes. Important key performance indicators are cecal intubation rate (CIR) and adenoma detection rate. CIR is globally recognized as the main measure of competence in colonoscopy in a non-screening setting and is one of the key measures used in a colorectal cancer screening.

The aims of our study were to determine rates of cecal intubation and polyps detection and to identify factors that may influence these two quality indicators for colonoscopy.

METHODS

We retrospectively analyzed all colonoscopies performed between January 2009 and Marsh 2013 in our department. Demographic data, indication of the procedure, and endoscopic diagnosis were collected. Procedure related quality indicators considered for analysis were: CIR and polyps detection rate (PDR). Cecal intubation was defined as passing the tip of the endoscope beyond the ileocecal valve lip. CIR was not adjusted for impassable strictures and poor bowel preparation. The quality of bowel preparation was classified at the time of the examination by each endoscopist as good, fair, or poor. Good is typically used to describe no or minimal solid stool and small amounts of clear fluid that require suctioning. Fair refers to collections of semisolid debris that are cleared with difficulty. Poor refers to solid or semi-solid debris that cannot be cleared effectively [4].

Statistical analysis was performed with SPSS version 19. Results were expressed as means and frequencies. Differences in proportions were analyzed by chi-square or Fischer test; differences in mean quantitative value were analyzed by student's t-test. Multivariate logistic regression analysis was performed to identify factors associated with PDR and CIR. P value less than 0.05 was accepted as statistically significant.

RESULTS

Patient demographics and endoscopists' description
A total of 859 examinations were studied. All colonoscopies were performed by board-certified specialists or fellows in training. All colonoscopies were done without sedation. The mean age of the patient population was 54.7 ± 17.5 years with 49.8% of the patients being women. The main indications for colonoscopy were the presence of alarming signs in 40%, screening for CCR in 8.1% and anemia in 5.1 %.

Complete colonoscopies accounted for 61.1% (525) of the examinations. The motives for incomplete colonoscopy were patient inadequate bowel preparation in 47.3% (158), intolerance in 34.4% (115), technical difficulties 13.7% (46), and obstructive lesions in 5.9% (20). The quality of bowel preparation was classified as: good in 24%, fair in 61% and poor in 15%. The overall PDR was 21%. The mean polyp size was 7,7mm +/-6,5 (1-25). The prevalence of polyps 1cm in size was 25%. The polyp distribution was as follows: left colon 63.7%

(130), right colon 22.6% (46) and transverse colon 17.7% (28). Colorectal cancer was found in 57 patients (6.6%).

Intra -procedural quality indicators:
Cecal intubation rate
Univariate analysis disclosed 3 predictive factors of CIR : the quality of bowel preparation (good vs fair or poor (67.2 % vs 31.3%, p = 0.0001,OR: 4.5, 95% CI: 3.3-6), the screening indication (72.9% vs 60.1% , p = 0.03, OR: 1.7, 95% CI: 1-3) and the presence of alarming signs (55% vs 43%, p=0.04; OR: 1.1, 95% CI:0.9-2.5).

By multivariate analysis, the screening indication (p=0.02, OR: 1.9, 95% CI: 1.1-3.4) and the quality of preparation (p=10-3, OR=2.23, 95% CI: 1.47-3.3) remained as independent factors associated with CIR.

Polyp detection rate
Male gender was associated with the detection of polyps: PDR was significantly higher in men than in women (25.1% vs 16.8%, p=0.001, OR:2.36, 95% CI: 1.4–4). PDR was higher in patients with good bowel preparation compared to fair or poor bowel preparation (26.5% vs 19.1%, p=0.03 OR:1.4, 95% CI:0.9 –2). Other factors significantly influencing PDR were: the screening indication (35.7% vs 19%, p=0.001 OR: 2.36, 95% CI: 1.4–4); associated colorectal cancer (50.9% vs 18.2%, p = 0.0001, OR: 4.6, 95% CI: 2.6-8) and age over 47 years (p=10-3, OR:3.2, 95 % CI:2-4.9).

By multivariate analysis, 3 independent factors associated with PDR were identified: age over 47 years (p=10-3, OR: 3.5 95% CI:2-5.9), bowel preparation (p=10-3 OR=5, 95% IC:2.7-9.6) and the screening indication (p=0.01, OR 2.5, 95% IC 1.4-4.7).

DISCUSSION

We studied two factors that predict high performance in colonoscopy: the CIR and the PDR. Our observed CIR is 61.1%, which is suboptimal compared to the benchmark [5]. This result may be related to the high incidence of patients with poor bowel preparation which was the major motive for an incomplete examination. The CIR has become the most universally recognized performance indicator. In fact, it is reasonable to assume that the effectiveness of colonoscopy is limited if the entire colon is not routinely examined. Effective endoscopists should achieve successful intubation of the cecum during colonoscopy in 90% of all cases, and 95% of procedures for colorectal cancer screening or colon polyp surveillance [6-8]. We disclosed two main factors which contributed to incomplete colonoscopies: the quality of bowel preparation and the indication other than screening for CCR. Variations in CIR are due to different reasons: physician variables such a skill including dexterity and training level, patient variables (age, gender, body mass index, past surgeries, tortuousity of the colon, pain threshold, and response to anesthesia), and the adequacy of bowel preparation [9-11]. Chung and al, found that older age, lower body mass index and previous hysterectomy were predictors of difficulty of cecal intubation [12]. Aslini and al, identified others factors that predict lower CIR such as female sex, older patient and the presence of diverticular disease [9]. Schoenfeld and al, suggested that cases in which procedures are aborted because of poor or inadequate bowel cleansing should not be counted in calculations of CIR and

rather utilize the CIR adjusted for poor bowel preparation or obstruction [13]. In cases of poor bowel preparation, we consider that colonoscopy should be repeated until adequate bowel cleansing is obtained, otherwise there is a risk to miss a neoplasic lesion. The high rate of "inadequate" bowel preparation in our study should warn us to give special attention to our implemented bowel preparation protocol. Indeed, for financial considerations, the purgative available in our hospital is a conventional bowel preparation with the polyethylene glycol-electrolyte (PEG). This regime requires large volume of fluid (4 liters of water) and is unpalatable, leading to poor compliance. Others cleansing agents and schedules have been studied such as sulphate free PEG, reduced volume (2 L) preparations coupled with irritant laxatives, aqueous and tablets preparations of sodium phosphate, which increase compliance and are as effective as the standard PEG preparation [4]. We believe that modification of the common type of bowel preparation may improve quality of colonoscopies in our department. Patient intolerance was another reason for incomplete colonoscopy in our cohort. Although the difference was not significant, this result highlights the need to perform colonoscopies with sedation in order to improve the quality of the procedure.

On the other hand, we focused on another quality indicator: the PDR. Ideally, adenoma detection rate (ADR) should be recorded but linking endoscopic with pathology data is difficult. In view of this difficulty, we have used polyp rather than adenoma detection in this study whilst recognizing the limitations of this approach. In fact, recent studies showed that PDR is a useful quality measure with a good correlation with the ADR [14-16]. Therefore, in our study, we used PDR as a surrogate marker of the ADR. Williams and al, proposed to attain the established benchmark ADR for men (25%) and women (15%), that endoscopists needed to reach a PDR of 40% and 30%, respectively [16]. These values are higher than the 21% rate that we disclosed. Our suboptimal rate can be explained by our insufficient cecal intubation

and bowel preparation. Nevertheless, our results regarding gender, age, and quality of bowel preparation as influencing factors for PDR are in accordance with the published literature [17]. Poor bowel preparation prolongs cecal intubation and withdrawal time and reduces detection of both small and large colon [18-20]. If bowel cleansing is "inadequate" to identify polyps >5 mm in size during a colonoscopy that is being performed for CRC screening or polyp surveillance then the procedure is considered suboptimal and should be repeated in 1 year or less [21]. Withdrawal time is another important indicator of quality that we could not evaluate in our study because none of the endoscopists reported withdrawal time. Studies have demonstrated that withdrawal time is directly linked to ADR and duration of 6 minutes or more is required for increased detection of significant lesions [22]. Our study has several limitations. Firstly, being a retrospective study, there was missing data regarding some of the most important quality indicators, such as withdrawal time and the adenoma detection rate. Secondary there was a subjective assessment of bowel preparation. The perception of good, fair, or poor between our endoscopists can be variable. With this data, we acknowledge that the assessment of the quality of colonoscopy in our center is limited. Nevertheless, our study provides crucial input for improving the quality of our bowel preparation protocol and our examinations.

CONCLUSION

In our endoscopy center, quality indicators such as CIR and PDR are still suboptimal and associated with the quality of bowel preparation, tolerance of the procedure, age and the indication of colonoscopy. In the future we should improve the quality of our examinations especially trough the bowel preparation protocol, a minimal withdrawal time and sedation.

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