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Extracolonic Findings in CT Colonography: Our Experience in 227 Cases

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ÖZET

BT kolonografide ekstrakolonik bulgular: 227 vakadaki tecrübemiz

Amaç: Çalışmamızın amacı asemptomatik hastalarda tarama amaçlı çekilen bilgisayarlı tomografik kolonografi (BTK) tetkiklerinde karşılaşılan ekstrakolonik bulguların (EKB) sıklığını ve tiplerini değerlendirmektir.

Yöntemler: Çalımamıza Nisan 2013-Nisan 2014 tarihleri arasında kolorektal kanser taraması amacıyla çekilen BTK tetkikleri dahil edildi. EKB C-RADS (CTC reporting and data system) yöntemi kullanılarak sınıflandırıldı. İki radyoloji uzmanı görüntüleri değerlendirdi.Hastaların demografik bilgileri kaydedildi. EKB varlığı ve çeşidi ortak karar yoluyla tesbit edilip not edildi.

Bulgular: Retrospektif olarak 227 vaka değerlendirdik. Çalışmamızda 121 kadın (ortalama yaş 58.9±7.1) ve 106 erkek (ortalama yaş 60.7±7.7) hasta vardı. 145 hastada EKB lar saptanırken 82 hastada EKB' ya rastlanmadı. EKB gözlenen hasta grubunda ortalama yaş anlamlı olarak fazlaydı ($p<0.01$). Klinik olarak önemli bulgular rastlanan grubun yaş ortalaması 61.7±8.7 iken klinik olarak az önemli bulgular gözlenen grubun yaş ortalaması 57.5±6.8'dir. Bu fark istatiksel olarak anlamlı olarak hesaplandı ($p=0.003$). EKB rastlanması açısından kadın ve erkek hasta grubları arasında istatiksel anlamlı farklılık saptanmadı ($p=0.397$).

Sonuç: BTK tetkiklerinde EKB'lara sık karşılaşılır ve artan yaşla bu sıklık daha da artar ancak bunların az bir kısmı klinik olarak önemli bulgulardır.

Anahtar kelimeler: Bilgisayarlı tomografik kolonografi, ekstrakolonik bulgular, tarama, asemptomatik hastalar

ABSTRACT

Extracolonic findings in CT colonography: Our experience in 227 cases

Objective: The aim of our study is to evaluate the frequency and the types of extracolonic findings (ECF) in Computed Tomography Colonography (CTC) performed for screening purposes in an asymptomatic population.

Methods: CTC examinations performed for Colo-Rectal Carcinoma (CRC) screening between April 2013 and April 2014 were included in the study. We classified ECF according to CTC reporting and data system (C-RADS). Two radiologists examined images. Patients' demographic data were documented. The presence and the types of ECF were determined in consensus.

Results: We evaluated 227 CTC retrospectively. There were 121 women (mean age 58.9±7.1) and 106 men (mean age 60.7±7.7). In 145 patients, ECF were detected and in 82 patients no ECF were found. The mean age was significantly higher in patients with ECF ($p<0.01$). The mean ages for clinically significant and insignificant groups were 61.7±8.7 and 57.5±6.8 years, respectively. This difference was statistically significant ($p=0.003$). There were no statistically significant difference between men and women in terms of ECF ($p=0.397$).

Conclusion: Although ECF are encountered frequently and even more often with increasing age, only limited fraction of them have clinically significant outcomes.

Key words: Computed tomography colonography, extracolonic findings, screening, asymptomatic patients

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INTRODUCTION

Computed tomographic colonoscopy (CTC) is a non-invasive method in detailed imaging of colon and rectum. It has been recognized as an alternative method in colorectal cancer (CRC) screening (1,2). Although conventional colonoscopy (CC) is still considered as the reference standard in polyp screening, CTC has been reported to have a sensitivity equal to that of conventional colonoscopy in detection of polyps and masses (2,3). Most important of all, owing to its minimally invasive nature and lack of the need for the sedation, it is a promising alternative to increase adherence to CRC screening programs. On the other hand there are inconclusive points for those who debate incorporating the method in guidelines. A distinctive feature is that since entire abdomen, lung basis and a part of the vertebral column are also scanned in CTC, it allows incidental detection of pathologies regarding these extracolonic areas. It has not been yet clearly shown that the detection of potentially significant extracolonic findings (ECF) result in a benefit due to early diagnosis and treatment or in a harm due to follow up or advance work-up for false positive findings.

To guide management of extracolonic findings, the Working Group on Virtual Colonoscopy developed a rating of extracolonic findings using a scale of E0 to E4 (4) (Table). According to this classification, E3 and E4 findings are potentially significant to the patient's health but incompletely characterized in CTC, and usually require further imaging and medical follow-up for definitive characterization. E3 findings (e.g., pulmonary nodules <1 cm or minimally complex cystic renal or adnexial masses) are likely to be insignificant and might require non-urgent follow-up. E4 findings (e.g., solid renal masses or pulmonary nodules >1 cm) are likely to be significant and require urgent follow-up. Several studies regarding extracolonic findings have been conducted. However, the types and frequency of ECF have not been explored in a Turkish patient population setting. In this study CTC images of 227 consecutive cases who had undergone screening have been retrospectively evaluated and ECF are reported.

METHODS

Our study has been approved by Institutional Review Board and informed consent was obtained from all patients. We retrospectively evaluated all CTC examinations that were performed for CRC screening in asymptomatic patients between April 2013 and April 2014. All studies were performed using a 256 multislice CT (Discovery 750 HD,GE, USA) and initially reported by BB, who had 10 years experience in abdominal imaging. All ECF were recorded in the initial report. The images were reviewed on the workstation (Advantage version 4.6, GE, USA) by BB and RT in consensus.

Patients were scanned both in supine and prone positions by using low-dose radiation. The parameters used were as following: slice thickness: 1.25 mm, equivalent pitch: 1.5, 1 mm reconstruction interval: 1mm, 100 mAs, 120 kVp.

Any significant correlations between ECF and patients' age and gender were statistically tested by Mann-Whitney U test and Student's T test (SPSS 21.0, IBM Corp., NY, USA. 2012).

ECF were classified in five groups according to CT Colonography Reporting and Data System (C-RADS)

Table 1: Classification of ECF

GROUP	Description	Example
E0	Limited examination: compromised by artifact; evaluation of soft tissues is severely limited	Due to the methalic artefact of hip prostesis, pelvic soft tissue structures may not be ..... visualized mı olmalı
E1	anatomic variant: no extracolonic abnormalities visible	Retroaortic left renal vein
E2	No clinically suspected finding: no workup indicated	Simple renal cyst, gallstone, liver parenchymal calcification
E3	Probably unimportant finding, incompletely characterized: workup may be indicated	Complex renal cyst, lung nodule,
E4	Probably important finding: communicate to referring physician as per accepted practice guideline	Abdominal aortic aneurism, renal mass, lymphadenopathy, retroperitoneal fibrosis

*ECF: Extracolonic findings

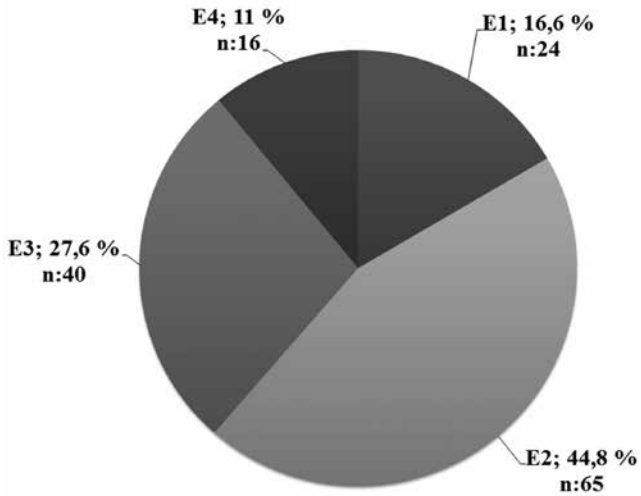


Figure 1: Distribution of extracolonic findings, n: numbers

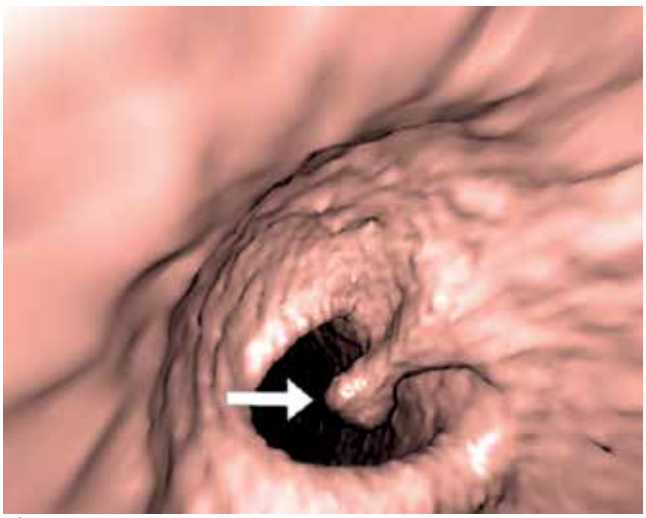


Figure 2: 3 Dimensional virtual imaging of colonic segment. Arrow shows polyp in descending colon

classification (Table). Since each group consisted of a few number of findings, group E1 and group E2 were combined as insignificant findings and group E3 and group E4 were combined as significant findings groups. E0 is stated for limited examination due to serious artifact. In our study there were no patient classified as E0. The demographic data and colonic findings were correlated with the ECF for each individual group.

RESULTS

We retrospectively evaluated CTCs of 227 patients (121 women and 106 men), that had been performed for screening purposes. The mean age was 58.9±7.1 for women and 60.7±7.7 for men. We detected ECF in 145 patients. And no ECF were found in 82 patients. The mean age was 59.4±7.1 year for patients with ECF and 49.1±6.3 year for patients without an ECF. The mean age was significantly higher in patients with ECF ($p<0.01$). We classified E3 and E4 as clinically significant group and E1 and E2 as clinically insignificant group. The mean ages for clinically significant and insignificant groups were 61.7±8.7 and 57.5±6.8 years, respectively. This difference was statistically significant ($p=0.003$). There were no statistically significant difference between men and women regarding ECF groups ($p=0.397$). Figure 1 summarizes the frequency of ECF groups.

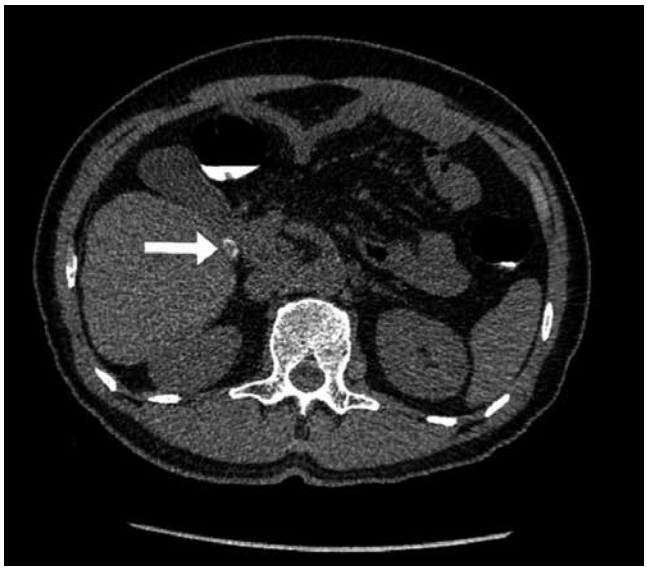


Figure 3: Axial CT imaging. Arrow denotes gallstones

We detected colorectal polyps (n=18) and masses (n=3) in 20 patients. We also detected 3 E4s (1 liver metastasis, 1 abdominal aorta aneurism and 1 kidney mass), 3 E3s (2 complex renal cysts and 1 lung nodule) and 4 E2 (2 gallstones and 2 simple renal cysts) in these patients (Figures 2 and 3).

DISCUSSION

CTC is a method primarily dedicated to evaluation of colonic segments; on the other hand, structures such as vessels, visceral organs, lung basis and a portion of vertebral column are also imaged and abnormalities regarding these areas can also be evaluated. In some patients this may be beneficial in detection and diagnosis of initially unsuspected abnormalities especially in those whose symptoms cannot be differentiated from those

related to colon cancer. Considering these cases, this feature might be taken as an advantage of CTC over other modalities used in colon screening. On the other hand, particularly in asymptomatic patients in the screening population, incidentally detected ECF in CTC is a matter of debate. Most of the time the ECF detected are irrelevant to clinical history. Evaluation and follow-up period increases patient anxiety. More over these patients might face potential complications during further work up and the cost increases. In any case, it is clear that incidentally detected ECF increase as the CTC is used as a screening tool. It is reported that in approximately 85% of patients undergoing CTC, ECF are detected (5). The number increases with the use of intravenous contrast material (6), increasing age (7), and increasing number of females screened as genital system is imaged at the same time (8). In previous studies, nearly 30% of ECF are assigned as E3 while 10% as E4 (4,9). Those ratios are compatible with the ratio obtained in our study. In addition, the result in this study indicates that the frequency of ECF detected increases as the patient age increases and this is consistent with the previous data.

One of the major problems regarding detection of ECF is that, the classification system is not standardized and differs among each individual study. This leads to different definitions for differentiating significant lesions from insignificant ones. In a meta-analysis by Xiong et al (10) reproducible and well-known pathologies are classified as significant and those included N0M0 malignancies and abdominal aorta aneurysms. This approach helps to compare different studies. Nevertheless, it excludes other significant pathologies such as hepatic abscess or retroperitoneal fibrosis.

In another study ECF that require additional work-up were defined as significant (11). However, this method excludes significant pathologies that can be diagnosed with CT and do not require additional work-up.

In order to guide management of extracolonic findings, the Working Group on Virtual colonoscopy has developed a classification system by dividing ECF in five groups (4). In this study this system was used for classification. On the other hand, it is still challenging to compare previous studies due to ambiguity in defining which pathology goes under which group. For instance splenomegaly was listed under E3 in this study whereas in another study by Bandiani et al. it was listed under E4 according to the data obtained after follow-up (12). On the other hand, since this system is to be used in order to clarify radiologic recommendation, the classification should be done according to current findings and symptoms rather than follow-up results although the fact that follow-up studies are still needed in order to obtain cost effectivity data on long term basis is also acknowledged.

It should be noted that CTC is a method with radiation exposure and the patient should benefit from this technique as much as possible. One way to achieve this goal is to evaluate all the organ systems involved in the study even in screening population. ECF may sometimes lead us to a short-cut for an unsuspected but a clinically significant diagnosis. For some particular cases such as malignancy, early detection will not only increase survival, but also decrease the costs. Besides, abdominal aorta aneurisms and hepatosteatosis can be diagnosed with CTC and early recognition of these entities can also increase survival rate and decrease the costs (13). On the other hand, unnecessary follow-up or further work up should be avoided because it may also lead to increased radiation burden, increased costs and patient anxiety. Since significance of most of the findings are interpreted according to clinical data, the radiologist should report those only after adequate clinical information is received and the radiologist should be sensible in offering follow-up or further work-up, which is only possible by working in a multidisciplinary manner with clinicians. Besides, locoregional differences such as incidence of the pathology or cost for further work-up of the patients should not be disregarded while interpreting the significance of the detected pathology and recommendation.

One of the major limitations in this study is the number of patients included. Besides, since the detailed clinical information was not given initially, while reporting the radiologist did not really know if the pathologies have been known already or not. However, to the best of our knowledge this is the first study carried out in only asymptomatic patients in Turkish population. More clinical trials with larger series with long term cost effectivity analysis in the same population are also needed.

In conclusion, this study supports the data that even in asymptomatic patients, CTC is helpful in obtaining ECF. Since most of the pathologies are clinically insignificantat the time of reporting, significance of pathology and recommendations should be noted clearly and in close contact with referring clinician.

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