A prospective national study on colonoscopy and sigmoidoscopy in 2000 in France

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SUMMARY

Aim — The aim of this study was to evaluate the practice of colonoscopy and sigmoidoscopy in France in 2000.

Methods — A prospective study was conducted in November 2000 using questionnaires sent to all gastroenterologists practicing in France (N = 2858) who were asked to reply to items concerning colonoscopies and sigmoidoscopies performed on two workdays chosen in advance. The response rate was 32.8%. Data were extrapolated to establish estimates for the entire year.

Results — An estimated 894,000 colonoscopies and 115,320 sigmoidoscopies were performed in 2000. Single-use material was used in 22.1% of the procedures. Indications for endoscopy were mainly hematochezia (21.6%), gastrointestinal symptoms (35%) and surveillance of patients with a history of previous polypectomy (15%). Colorectal cancer screening was the indication for 20% of colonoscopies. Abnormal findings were reported for 54.8% of the colonoscopies with polypectomy was 224,133. Failure was noted in 4.9% of colonoscopies. The complication rate was 0.48%. Most polyps were adenomas (64.4%) or hyperplastic polyps (28.1%). The overall estimated number of colonoscopies was 224,133.

Conclusion — In 2000 there was an increased rate of colonoscopy for colorectal cancer screening (20%) but an overall decrease (2.5%) in the total number of colonoscopies compared to 1999. Abnormal findings were disclosed by 54.8% of the procedures. Extrapolation from these data indicates that colonoscopic screening enabled the diagnosis of 32,799 colorectal cancers.

RÉSUMÉ

Enquête prospective nationale sur la pratique de l’endoscopie digestive basse en 2000

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Méthodes — Une enquête prospective a été réalisée en novembre 2000 auprès des gastro-entérologues (N = 2 858) par un questionnaire portant sur 2 jours fixés préalablement. Des extrapolations ont été réalisées sur l’année et sur le nombre de jours travaillés.

Résultats — Un nombre estimé de 894 000 coloscopies et de 115 320 rectosigmoidoscopies ont été réalisées en 2000. Le matériel à usage unique était utilisé dans 22,1 % des cas. Les principales indications étaient des rectorragies (21,6 %), des douleurs abdominales et des troubles fonctionnels intestinaux (35 %) et une surveillance pour antécédents de polypectomie (15 %). Vingt pour cents des coloscopies ont été réalisées pour dépistage de cancer. L’endoscopie était pathologique dans 54,8 % des cas (estimations de 287 218 endoscopies avec polyopes et 32 799 avec cancers). Un échec était constaté dans 4,9 % des colonoscopies. Le taux de complications était de 0,48 %. Les résultats histologiques étaient le plus souvent, pour les polypes, des adénomes (64,4 %) et des polypes hyperplasiques (28,1 %). Au total le nombre estimé de colonoscopies avec polypectomies était de 224 133.

Conclusion — L’augmentation des colonoscopies de dépistage (20 %) n’a pas entraîné d’augmentation des endoscopies en 2000 (diminution de 2,5 % par rapport à 1999). Dans 54,8 % les endoscopies étaient pathologiques. L’extrapolation des résultats de cette enquête indique que les endoscopies basses ont permis de diagnostiquer 32 799 cancers.

Introduction

Colonoscopy is widely used for the diagnosis and screening of colorectal cancer (CRC), the most frequent gastrointestinal cancer in the French population. According to cancer registries, the annual incidence is 33,500 new cases of CRC per year, including 21,500 (65%) cases of colonic cancer. In France, 15,000 to 16,000 persons die from CRC annually. The estimated rate of survival at five years is 41%. Improved prognosis is possible with early diagnosis. Generally, 60 to 80% of CRCs are secondary to malignant transformation of adenomatous polyps. Endoscopic polyectomy enables a reduction in the incidence and mortality of CRC. Since the national consensus conference on prevention, screening and management of colonic cancers held in 1998, it has been clearly established that CRC-related mortality can be reduced by screening for CRC by searching for occult blood in stools. Pilot studies are
being conducted in 22 administrative districts of France. Screening colonoscopy should be proposed from the age of 45 years in first-degree relatives of patients developing CRC before the age of 60 years and, most importantly, in all patients with a personal history of CRC, adenoma measuring more than 1 cm, adenomas with a villous component, or pancolitis for 15—20 years. Regular surveillance is indicated for members of families with familial adenomatous polyposis (FAP) or hereditary non-polyposis colorectal cancer (HNPCC). Rectosigmoidoscopies should be performed annually for FAP and total colonoscopy every two years for HNPCC [1-7]. In 1999, the French Society of Digestive Endoscopy (SFED) initiated a prospective national annual survey to describe and quantify gastroenterology endoscopic procedures performed in France. The goal of the 2000 survey was to:

— detail the results of lower gastrointestinal endoscopic procedures in comparison with the earlier surveys;
— compare with earlier years the changes in the number of procedures performed, their indications, and results;
— determine the number of colorectal polyps and malignant tumors diagnosed;
— analyze histological data on colorectal polyps and cancers.

Methods

A prospective national survey was conducted using a questionnaire sent to all gastroenterologists practicing in France (N = 2858). For each practitioner, data were collected on two consecutive work days, which were fixed before the survey within a 15-day period (Monday, November 13 to Saturday, November 25, 2000). Complete responses were received from 939 practitioners (3257 patients). The response rate was 32.8%. Twenty-nine percent of the practitioners did not perform endoscopic procedures during the two days of the survey.

A sample was selected taking into consideration practitioner demographics (gender, age, region and type of practice). Results were extrapolated from this sample to 2858 practitioners performing endoscopic procedures (hospital practice 90%; mixed private and hospital practice 9%). Data were extrapolated for the year based on the number of working days (234 for hospital practitioners and 244 for practitioners with a mixed or private practice).

The questionnaire included an information sheet for the practitioner to record age, gender, administrative district of practice, type of practice (hospital, private, both), place of practice and facility where endoscopic procedures were performed (hospital, clinic, private consultation, independent center) and an information sheet for the patient. For each patient undergoing colonoscopy or rectosigmoidoscopy during the two survey days, data recorded were: type of endoscopy facility, type of endoscope used, setting (inpatient or outpatient), type of accessory material, and disinfection procedure. The patient’s age, gender, and personal or familial history of polyps or gastrointestinal cancer were also recorded as well as the referral procedure.

Presence of polyps and/or cancer noted during an earlier endoscopic procedure was also noted as well as the time between the two procedures. The type of anesthesia used for each procedure and indications for endoscopy were detailed. Endoscopy results were recorded as normal or pathological with a precise diagnosis for pathological procedures (polyp, cancer, inflammatory disease, radiation-induced disease, ischemic or pseudomembranous disease, Crohn’s disease or ulcerative colitis, simple or complicated diverticulosis, melanosis). The number of polyps and the size of the largest polyp were noted as well as the localization of polyps and cancers. Results of all pathology examinations for polyps or cancer were sent to the investigating center, Stethos. All endoscopic lesions identified as polyps were submitted to histology. Results were recorded as normal or pathological with a precise diagnosis for pathological procedures. The type of anesthesia used for each procedure and indications for endoscopy were detailed. Endoscopy results were recorded as normal or pathological with a precise diagnosis for pathological procedures (polyp, cancer, inflammatory disease, radiation-induced disease, ischemic or pseudomembranous disease, Crohn’s disease or ulcerative colitis, simple or complicated diverticulosis, melanosis). The number of polyps and the size of the largest polyp were noted as well as the localization of polyps and cancers. Results of all pathology examinations for polyps or cancer were sent to the investigating center, Stethos. All endoscopic lesions identified as polyps were submitted to histological analysis to differentiate adenoma, hyperplastic polyp or other lesion.

Any procedure-related complication was mentioned (bleeding, septicaemia, anesthesia-related side effect, perforation, death).

Statistical analysis was performed by Stethos.

Results

Lower gastrointestinal procedures

In 2000, an estimated number of 1,007,688 lower gastrointestinal endoscopic procedures were performed in France (2.5% less than recorded in the 1999 survey). The estimated number of colonoscopic procedures was 894,000 (88.6% of procedures). There were 115,320 rectosigmoidoscopies (11.4% of procedures). In 1999, the figures were 900,884 and 132,295, respectively.

Data concerning the endoscopy center, type of anesthesia, endoscopes and accessory material as well as disinfection procedures were detailed in Table I.

In 2000, 95.7% of colonoscopies were performed in well-equipped reference centers. General anesthesia performed by an anesthesit was the rule for colonoscopies (91.9%). Intravenous sedation, performed by the operating gastroenterologist, was noted for 2.3% of patients. The use of videendoscopes for colonoscopy increased from 78.2% of procedures in 1999 to 94.6% in 2000. One-third of the endoscopes employed in private offices were optical fiber devices.

Single-use material was used exclusively in 22.1% of the procedures in 2000 versus 14.1% in 1999. Use of autoclavable material decreased 14.3% compared with 1999. Automatic disinfection procedures were used for 51.7% in 2000 versus 48.6% in 1999.

Population

The sex ratio was 0.87 (53.6% women and 46.4% men). Mean patient age for colonoscopy procedures was 58.1 years with 46.5% of the patients in the 51—70 year age range. Colonoscopy was performed in patients aged over 80 years for 4.1% of procedures. Patients were aged less than 50 years for 30.5%. More than half of the patients (58.2%) were new patients who had not undergone any earlier endoscopic procedure. The majority of patients (66.1%) were referred by a general practitioner and 20.2% consulted the specialist directly.

Indications for lower gastrointestinal procedures

Indications for lower gastrointestinal endoscopy are presented in Table II. The indication was screening for polyps and/or colorectal cancer for 20.1% of the procedures. Other indications included hematohexia (21.6%), abdominal pain (19.9%), functional gastrointestinal disorders (15.1%). Surveillance after polypectomy was the indication for 15% of the colonoscopies, surveillance of colonic cancer for 5.9%.

Considering all screening colonoscopies (estimated 191,185 procedures), 80.4% (153,620) were performed in subjects with a familial history (first-degree relative), 12.6% (24,090) at the patient’s request, and 9.8% (18,730) after a positive fecal occult blood test.

Colonoscopy had been previously performed in 40.5% of patients. Time since the last procedure was less than one year for 6%, one to three years for 26.1%, three to five years for 29.5%, five to ten years for 36.2%, and more than ten years for 8.3%.

Results of lower gastrointestinal endoscopy

More than half of the lower endoscopic procedures performed in 2000 were pathological (54.8%, estimated 562,120 colonoscopies).

The most frequent observation was the discovery of colorectal polyps (51.3% of the pathological procedures, estimated 287,218 colonoscopies). Other pathologies included uncompli-
Table I. – Characteristic features of colonoscopic and rectosigmoidoscopic procedures performed in France in 2000.

<table>
<thead>
<tr>
<th>Type of endoscopic procedure</th>
<th>Total</th>
<th>Total colonoscopy</th>
<th>Rectosigmoidoscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Endoscopy facility</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private clinic</td>
<td>68.2%</td>
<td>72.8%</td>
<td>29.1%</td>
</tr>
<tr>
<td>Hospital</td>
<td>23.9%</td>
<td>21.2%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Private office</td>
<td>6.5%</td>
<td>4.3%</td>
<td>24.9%</td>
</tr>
<tr>
<td>Independent center</td>
<td>1.5%</td>
<td>1.7%</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Setting</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outpatient</td>
<td>69.9%</td>
<td>71.8%</td>
<td>64.1%</td>
</tr>
<tr>
<td>Inpatient</td>
<td>30.1%</td>
<td>28.2%</td>
<td>35.9%</td>
</tr>
<tr>
<td><strong>Anesthesia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General anesthesia performed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>by anesthesit</td>
<td>83.2%</td>
<td>91.9%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Intravenous sedation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>by gastroenterologist</td>
<td>2.2%</td>
<td>2.3%</td>
<td>1.5%</td>
</tr>
<tr>
<td>No anesthesia</td>
<td>14.7%</td>
<td>5.8%</td>
<td>87.9%</td>
</tr>
<tr>
<td><strong>Type of endoscope</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Videendoscope</td>
<td>92.6%</td>
<td>94.6%</td>
<td>76%</td>
</tr>
<tr>
<td>Optic fiber device</td>
<td>7.4%</td>
<td>5.4%</td>
<td>24%</td>
</tr>
<tr>
<td><strong>Accessory material</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-use exclusively</td>
<td>22.1%</td>
<td>21.4%</td>
<td>28.7%</td>
</tr>
<tr>
<td>Autoclavable exclusively</td>
<td>57.4%</td>
<td>57%</td>
<td>61.2%</td>
</tr>
<tr>
<td>Single-use and autoclavable</td>
<td>20.5%</td>
<td>21.6%</td>
<td>10.1%</td>
</tr>
<tr>
<td><strong>Disinfection</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual</td>
<td>48.3%</td>
<td>47%</td>
<td>61.3%</td>
</tr>
<tr>
<td>Automatic</td>
<td>51.7%</td>
<td>53%</td>
<td>38.7%</td>
</tr>
</tbody>
</table>

Colorectal polyps

Based on the data collected in this survey, an estimated 492,892 polyps were removed and 32,799 colorectal cancers were diagnosed in France in 2000. The most frequent localization for polyps was the descending colon (68.6%). Other localizations were the ascending colon (28.4%) the transverse colon (14.9%), and the rectum (31.5%). Patients had one polyp (59.1% of patients), two polyps (19%), three polyps (11.4%), four polyps (4%), five polyps (6.6%) or more than five polyps (0.1%); 40.9% of patients had several polyps.

Adenomas predominated (64.4% of polyps), followed by hyperplastic polyps (28.1%) and degenerated polyps (4.2% high-grade dysplasia/in situ carcinoma). Other histological types were juvenile polyps (0.3%), lipomas (0.2%) and normal colonic mucosa (1.7%).

The sigmoid colon was the most frequent localization for polyps (37.8%). Other localizations were the rectum (15.5%), the transverse colon (21.7%), and the ascending colon (25%).

cated diverticulosis (32.2%), complicated diverticulosis (6.4%), malignant colorectal tumor (5.9%, estimated 32,799 cancers) and inflammatory colitis (unclassified 4.8%, ulcerative colitis 2.3%, Crohn’s disease 1.7%).

Among the patients who had a prior colonoscopy, irrespective of the indication or time between procedures, 54.3% presented colorectal polyps and 3.1% had a malignant colorectal tumor (estimated 133.484 and 7.957 patients, respectively).

Of the patients who had had a prior colonoscopy which had disclosed the presence of polyps, and who also had a pathological colonoscopy during the present study, 72.9% had new colorectal polyps and 1.2% had a malignant colorectal tumor (estimated 92.186 and 1.505 patients, respectively).

In patients where a previous colonoscopy which had disclosed colorectal cancer, and who also had a pathological colonoscopy during the present study, 51.1% had colorectal polyps and 22% had a malignant colorectal tumor (estimated 11,716 and 5,042 patients, respectively).
Other procedures performed during the lower gastrointestinal endoscopy

Ninety percent of the therapeutic procedures were polypectomies (estimated 224,133 endoscopic procedures for polypectomy). Plasma argon electrocoagulation was performed in 3.4% of the therapeutic procedures, mucosectomy in 3.1%, and colorectal dilatation in 2.1%. Colonic prostheses were implanted in 198 patients. Other therapeutic procedures are detailed in table III.

The colonoscopic procedure was considered incomplete in 41.925 patients (4.7% failure) due to technical problems in 36.3%, insufficient colonic preparation in 33%, colonic blockage in 29.6%, and another reason not specified by the gastroenterologist in 7%.

Complications

Complications were noted to occur in 0.48% of the lower endoscopic procedures (estimated 4,883 patients) due to bleeding (36.7%), a problem with the anesthesia (22%), perforation (13.3%), septicemia (5%), and undetermined cause (27.9%).

Discussion

The purpose of this prospective study was to evaluate colonoscopy and rectosigmoidoscopy practice in France. No other data are currently available for rectosigmoidoscopy. This survey ena-
bled us to better assess practice conditions and the results of lower endoscopic procedures performed throughout France.

The survey conducted in 1999 showed that colonoscopies and rectosigmoidoscopies accounted for 40.4% and 5.9% of all endoscopic procedures performed in France (versus 46.8% for gastroscopies, 2.2% for endoscopic ultrasound procedures, 1.1% for retrograde catheterism, and 0.2% for enteroscopies) [8, 9].

Concerning practical modalities, our survey showed that 94.2% of the colonoscopies were performed under general anesthesia in 2000, a increase compared with 1999 (92.2%). Intravenous sedation performed by the gastroenterologist remains marginal (2.3%). The French Society of Intensive Care (SFAR) will shortly publish recommendations for assuring the safety of colonoscopies performed under sedation.

Availability of videendoscopes has progressed (94.6% of the procedures in 2000). Use of high-performance endoscopic material equipped with zooms and chromoendoscopy is needed to improve detection yield for small-sized or flat adenomatous lesions. In 95.7% of the procedures, the colonoscopy was performed in well-equipped centers allowing specific surveillance of patients undergoing endoscopic procedures. Two-thirds of the lower procedures were performed in an outpatient setting.

The number of colonoscopies and rectosigmoidoscopies performed in 2000 was slightly lower than in 1999 (0.8% and 1.5%, respectively) despite an increase in the number of screening colonoscopies which accounted for 20% of the indications in 2000 versus 13.3% in 1999. Only 9.8% of the screening colonoscopies were performed after a positive fecal occult blood test. Hematochezia was the main indication for colonoscopy (21.6%). In all, 287,218 colorectal polyps were discovered, the most frequent pathology.

In the present study, the time since prior colonoscopy could not be determined for patients with polyps or colonic cancer. Among the patients who had had a prior colonoscopy and whose current procedure was pathological, 54.3% had polyps and 3.1% had CRC.

Avidan et al. [10] reported that adenomas were found in 37% of patients who had undergone adenoma resection one to five years earlier and that adenomas were detected in 19% of the patients whose prior colonoscopy was normal. Risk factors of recurrent polyps are well known and should be carefully noted: history of large adenomatous polyp (> 1 cm) or presence of multiple polyps initially (relative risk of recurrence increased 2.6-fold and 4.5-fold respectively). Le Bodic et al. [11] reported that endoscopic surveillance at three to five years was unable to protect a population of patients with a history of adenoma from development of a new severe lesion. In our study, the number of polypectomies performed during lower endoscopic procedures (estimated 224,133 in 2000) increased compared with 1999 (201,323) despite the smaller number of endoscopies. Plasma argon coagulation was the second most frequent therapeutic procedure (3.4%) while the number of laser indications declined (0.4% of the therapeutic procedures).

The complication rate for colonoscopy was 0.48%; there were an estimated 4,883 complications, with 650 perforations per year (0.06%) (whether these perforations occurred during therapeutic or diagnostic procedures was not noted). Bleeding occurred for 0.18% of endoscopies; 43% were controlled endoscopically. Other complications were related to anesthesia (0.1% infection (0.02%) and other non-detailed events (0.13%). The questionnaire collected data on early complications so the rates do not concern late complications (late perforations, late bleeding after polypectomy, abdominal pain, prolonged hospitalization or death).

In the literature, overall morbidity has been higher, estimated at 5% of procedures with a 0.02% death rate. Perforations occurred at a higher rate than in our study (0.1% overall; and 0.2% to 0.3% for therapeutic colonoscopy). Bleeding remains the most frequent complication. In other studies, the mean frequency of bleeding after diagnostic colonoscopy is to the order of 0.02% but can be much higher after therapeutic colonoscopy (0.67% to 3%) [12]. Our data only concerned early hemorrhagic events. It would be useful to obtain data on late-onset hemorrhagic events, up to 21 days after endoscopy.

Table III. – Endoscopic treatment performed during colonoscopic and sigmoidoscopic procedures in 2000.

<table>
<thead>
<tr>
<th>Type of endoscopy</th>
<th>N</th>
<th>Total</th>
<th>Colonoscopy</th>
<th>Rectosigmoidoscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypectomy</td>
<td>224133</td>
<td>90%</td>
<td>93.5%</td>
<td>49.3%</td>
</tr>
<tr>
<td>Plasma argon</td>
<td>851</td>
<td>3.4%</td>
<td>2%</td>
<td>25.9%</td>
</tr>
<tr>
<td>Electrocoagulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mucosectomy</td>
<td>7846</td>
<td>3.1%</td>
<td>2.9%</td>
<td>7.4%</td>
</tr>
<tr>
<td>Colorectal</td>
<td>5167</td>
<td>2.1%</td>
<td>1.1%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Dilatation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser</td>
<td>895</td>
<td>0.4%</td>
<td>0.1%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Colonic prosthesis</td>
<td>198</td>
<td>0.1%</td>
<td>-</td>
<td>1.3%</td>
</tr>
<tr>
<td>Exsufflation</td>
<td>2215</td>
<td>0.9%</td>
<td>0.4%</td>
<td>5%</td>
</tr>
<tr>
<td>Colonoscopy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric coagulation</td>
<td>2055</td>
<td>0.8%</td>
<td>0.8%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Associated surgical procedure</td>
<td>1147</td>
<td>0.5%</td>
<td>0.3%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Other</td>
<td>3060</td>
<td>1.2%</td>
<td>1.2%</td>
<td>2.8%</td>
</tr>
</tbody>
</table>
Quality-control of colonoscopic procedures should be encouraged: high-resolution high-performance equipment, good quality colonic preparation, meticulous examination using chromoscopy and attentive assessment of difficult areas such as the caecum, the splenic and hepatic flexures, or the rectosigmoid junction.

Patients who have had multiple polyectomies, particularly for flat adenomas or polyps measuring more than 1 cm, or who have had mucosectomy should have a colonoscopic control one to three years later, depending on the results of histology. Progress in molecular biology has led to the identification of two mechanisms of genomic and chromosomal instability in colorectal cancer. Loss of heterozygosity (LOH) is found in 80% of colorectal cancers (more than two-thirds situated in the distal colon) and microsatellite instability (MSI) is associated with carcinoma of the proximal colon; in the later case multiple lesions are generally found but the prognosis is better [13-18]. Determining the molecular status of the tumor enables better patient management. Progress in identifying patients at risk of recurrence should be helpful in designing individual surveillance programs [19].

CRC, the second leading cause of death by cancer after lung cancer, is an important public health issue in France. It is frequent and severe (curative therapy is achieved in only one out of two patients). Our study estimated that 32,799 new cases of CRC are diagnosed annually in France. These data are in line with the literature. Improved prognosis of colorectal cancer, observed in the United States) has been made possible by improved earlier detection [13, 20-21]. We estimate that in 2000, colonoscopic procedures performed in France enabled 492,892 polypectomies. The consensus conference of 1998 does not appear to have led to an increase in the total number of colonoscopies performed despite the increase in the number of procedures performed for screening purposes. This prospective national study is representative of the annual practice of lower gastrointestinal endoscopy in France. Despite the limitations and biases of this study, these figures are comparable to those previously reported. Strategies for screening and surveillance endoscopy should be developed and generalized in order to reduce the annual incidence of death by colorectal cancer. This reduction in annual deaths by colorectal cancer can be achieved only by a screening strategy focusing on both men and women aged over 50 years.

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REFERENCES