

Research Article

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Is Metabolic Syndrome a Risk Factors for Precancerous Colonic Lesions?

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Abstract

Introduction: Metabolic syndrome (MS) is considered a possible risk factor for CRC, also because it affects bowel cleansing. As primary aim, association between MS or each parameter of MS and the prevalence and histology of precancerous colonic lesions (PCL) was examined. The secondary aim was to analyze the impact of these on bowel cleansing. precancerous colonic lesions (PCL) were examined.

Methods: In this observational single-center study, all consecutive outpatients, who underwent colonoscopy from May to September 2014, were enrolled. For statistical analysis, patients were collapsed into two groups according to the presence or absence of MS.

Results: 1257 patients were enrolled. MS was a risk factor for serrated lesions in the left colon (3% vs 1.2%; p=0.049). Analyzing MS parameters, only a higher BMI was associated with an increased risk of having an adenoma overall (25% for BMI >30), for colonic lesions in the left colon (RR 30%; p<0.01) and only for adenoma in the right colon (RR 30%; p<0.05). MS was inversely related with bowel cleansing overall and per-segments.

Conclusion: The presence of MS and obesity should be taken into consideration prescribing bowel preparation regimen and also for post-polypectomy surveillance, as these elements should be considered as aggravating cancer risk.

Keywords: Metabolic syndrome; Serrated polyp; Obesity; Colon cancer risk; Observational study; Bowel preparation

Introduction

Colorectal cancer (CRC) is still a global problem and nowadays it represents the second cancer for incidence in Italy [1]. Hence primary prevention, with lifestyle and diet modifications, and secondary prevention, based on identification and endoscopic resection of precancerous lesions (i.e. adenomas) have a crucial role for the reduction of CRC incidence and mortality [2-8].

Metabolic syndrome (MS), defined as the combination of at least two among type 2 diabetes mellitus, hypertension, hypertriglyceridemia and dyslipidemia, plus an increase of waist circumference [9], can represent a risk factor for the develop of CRC [10-14]. This can be partially explained by the increased rate of inadequate bowel cleaning of patients affected by MS which decreases the protective role of in the prevention of CRC, reducing Adenoma Detection Rate (ADR) and cecal intubation [15-18]. The link between CRC and MS can be particularly relevant in the developed countries, where the incidence of MS is high.

The primary aim of this study was to evaluate the association between MS or each parameter of MS and prevalence of precancerous colonic lesions. As secondary aim, the impact of MS or each parameter of MS on bowel cleansing was analyzed.

Materials and Methods

In this observational single-center study, all consecutive outpatients who underwent colonoscopy from May 2014 to September 2014 at Fondazione Poliambulanza Hospital were enrolled. All patients received an informative letter and signed informed consent. Exclusion criteria were refusal to sign informed consent and incomplete colonoscopy, except when the cause was a neoplastic stenosis.

For all enrolled patients, the following data were collected: weight, height,

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BMI, gender, age, history of hypertension, diabetes, dyslipidaemia, waist circumference, bowel habits. Height and weight were measured without shoes and clothes. Circumferences were measured using a stretch resistant tape. Waist circumference was measured halfway between the lower ribs and the iliac crest at the end of a normal expiration, while hip circumference was measured at the largest circumference around the buttocks with the tape parallel to the floor. All these data were recorded to estimate the prevalence of MS in the analyzed population, according with the definition of International Diabetes Federation [9]. Furthermore, data about bowel preparation scored according to Boston Bowel Preparation Scale (BBPS) [19] and characteristics of colonic lesions detected (location, size, number and histology) were collected. Colonic superficial neoplastic lesions were classified according to the Paris classification [20,21]. All colonic lesions detected were resected during colonoscopy, if technically possible. For advanced neoplasia, biopsies were performed.

This study was approved by the Independent Ethical Committee of Brescia and it was also carried out according to Good Clinical Practice and Declaration of Helsinki policy.

Statistical analysis

Data were collected on a specific case report form (CRF). Descriptive

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analysis included rates and proportions for categorical data and mean values and standard deviations for continuous data. Chi-square test and Student's t-test have been used to compare differences between the groups. For all the analysis, p<0.05 has been considered as statistically significant. Univariate and multivariate analysis were performed to examine the interaction between the different variables through stratified analyses.

For statistical analysis, patients were collapsed into two groups first according to the presence or absence of MS and then according to presence of absence of each MS parameter. Then, for the primary aim, number and histology of polyps detected were compared between the groups. Finally, for the secondary endpoints, overall and per-segment bowel cleansing levels were compared between the abovementioned groups.

Results

Patient's

characteristics

A total of 1257 consecutive patients were enrolled. Epidemiological data and patients' characteristics were shown in details in Table 1. MS was diagnosed in 133 (10.6%) patients. Overall, 1427 precancerous (1302 polypoid e 125 non polypoid) lesions and 92 cancers were detected.

| Patients | Total (M:F) | 1257 (599:658) |
|--------------|---------------------|--------------------|
| | Age, mean (± SD) | 59.55 yo (± 13.45) |
| Epidemiology | Metabolic Syndrome | 133 (10.6%) |
| | Hypertension, n (%) | 370 (29.4%) |
| | Diabetes, n (%) | 85 (6.7%) |
| | Dyslipidemia, n (%) | 163 (13%) |
| | Obesity, n (%) | 173 (13.7%) |

BMI ≤ 18, n (%)

BMI, 19-25, n (%)

BMI, 26-30, n (%)

BMI, 31-35, n (%)

BMI, 36-40, n (%)

BMI > 40, n (%)

Legend: SD=Standard Deviation; yo=years old; BMI=Body Mass Index.

35 (2.8%)

638 (50.7%)

411 (32.7%)

136 (10.8%)

34 (2.7%)

3 (0.2%)

 Table 1: Comorbidities and Patient's characteristics

For the primary aim, 173 polypoid, 8 non-polypoid lesions and 18 cancers were detected in patients with MS versus 1129 polypoid, 117 non-polypoid lesion and 78 cancers in Non-MS Patients, with no statistically significant differences. The only statistically significant difference was obtained in terms of increased risk serrated lesions in the left colon between MS and non-MS group (3% vs 1.2%; p=0.049); while no statistically significant difference was obtained for adenomas, independently from the grade of dysplasia and location in the colon.

Analyzing each parameter of MS, patients with higher BMI had an increased risk of having an adenoma overall (20% vs 25% for BMI between 25 and 30 and >30, respectively) and above all in the right colon (RR 30%; p<0.05). Moreover, BMI was a risk factor for colonic lesions in the left colon, independently from histology (RR 20% if BMI 25-29.9; RR 30% if BMI >30; p<0.05).

Finally, for the secondary aims, overall mean bowel cleansing score was $5.15 \pm 2,35$ (1.86 ± 0.74 , 1.79 ± 0.74 , 1.69 ± 0.77 in rectum, left and right colon, respectively). MS was inversely related with the quality of overall

bowel preparation (54,5 vs 63,4% in non-MS patients; p<0.05) and persegment bowel preparation (64.2% vs 75.5, 61,9% vs 72% and 54,5% vs 64,4% in rectum, left and right colon, respectively).

Discussion

Colorectal cancer is a real and actual problem for Western countries and this problem has been widely explored in terms of risks factors and prevention campaigns [1-8]. Our data showed that the incidence of precancerous and neoplastic lesions was higher in those patients presenting the known clinical condition related with the oncological risk (sex, age, colonoscopy for red flags symptoms, good result of bowel cleansing) as literature widely demonstrated yet.

The relationship between colorectal cancer and precancerous lesions with MS has been also widely explored and there is a correlation between them [12,13,22-25]. The association between these two conditions is particularly relevant due to the increasing incidence of MS in western countries in the last decades.

Analyzing each parameter of MS, our results showed a significant neoplastic risk only in patients with higher BMI, due to the increased risk of adenomas, both in the right and left colonic segments. Furthermore, MS negatively affect the quality of bowel preparation.

In 2007 Larsson et al. [26] showed through a meta-analysis the correlation between the obesity and rectal cancer. In 2013 Esposito et al. [12] showed that MS was associated with an increased risk of CRC incidence and mortality and also there was demonstrated a higher risk in correlation with the increase of BMI. These data corroborate the strength of our study forasmuch as our patient sample showed the same correlation risk between colorectal cancer/precancerous lesions and BMI value.

Several study showed this correlation but in a prospective study Trabulo et al. [13] concluded that the positive correlation between colorectal cancer and precancerous lesions wasn't for BMI value in general but rather with waist circumference ("abdominal obesity") and also that MS was in correlation with a higher risk only for multiple synchronous adenomas and sessile adenomas.

Unlike this study we did not find significant differences in terms of impact of MS for the prevalence of adenoma as Koh et al. [27] showed in a retrospective study, while the worthy aspect of our data was that MS increased the risk of having serrated lesions in the left colonic segments.

Secondly, the impact of MS on bowel cleansing was largely analyzed in literature and MS was shown to be inversely related with the quality of bowel preparation [16,17], which is a relevant risk factor for missed adenomas and advanced adenomas in two meta-analyses [28,29].

Our results confirm that bowel cleansing is negatively burdened by MS, although this data are limited by the suboptimal overall bowel cleansing in both groups. This was probably due to the low prevalence (46%) of "split dose" regimen preparation, which is the recommended bowel preparation according to ESGE guidelines [30]. Therefore, MS can negatively influence the protective role of colonoscopy in the detection and removal of premalignant lesions.

Conclusion

MS and above all obesity could be considered an oncological risk factor both increasing the risk of having adenomas and serrated lesions and decreasing the quality of bowel preparation. This result suggests that the presence of these conditions should be taken into consideration prescribing bowel preparation regimen for colonoscopy and also during Citation: Petruzzellis C, Milluzzo SM, Petruzzellis N, Cesari P (2022) Is Metabolic Syndrome a Risk Factors for Precancerous Colonic Lesions? J Gastrointest Dig Syst.13: 726.

the decision of the post-polypectomy surveillance, forasmuch as patients affected by MS should be considered a higher oncological risk category in screening programs or at least this clinical condition should be considered worthy of a dedicated surveillance path with tighter intervals given the evident correlation between the oncological process and the MS.

Ethics Approval and Consent to Participate

The study was reviewed and approved by the Independent Ethical Committee of Brescia. It was also carried out according to Good Clinical Practice and Declaration of Helsinki policy.

Consent for Publication

Not applicable.

Availability of Data and Materials

Data and materials were archived at Fondazione Poliambulanza Hospital.

Competing Interests

None.

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Not Applicable.

Author's Contributions

Carlo Petruzzellis e Sebastian Manuel Milluzzo wrote the manuscript Nicola Petruzzellis made the statistical analysis. All authors reviewed the manuscript.

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