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Mechanical Bowel Preparation in Colorectal Surgery

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A B S T R A C T

The aim of this study was to assess the use of mechanical bowel preparation (MBP) and antimicrobial prophylaxis in elective colorectal surgery regarding still existing controversies. A prospective study of 85 patients undergoing elective colon and rectal surgery during 2 years period was performed, divided in two groups. Group A (N=46) with patients who underwent mechanical bowel preparation, and group B (N=39) patients without mechanical bowel preparation. We analysed: gender, age, preoperative difficulties, diagnostic colonoscopy, tumor localization, operation performed, pathohystological findings, Dukes classification, number of lymphonodes inspected, liver metastasis, other organ infiltrations, mean time of surgery, length of hospital stay, postoperative complications and mortality. Demographic characteristics, pathohystological findings, the site of malignancy, and type of surgical procedure did not significantly differentiate the two groups. The only significance revealed in mean time of surgery (138/178 minutes) in favor of patients with MBP (p=0.017). Mechanical bowel preparation (MBP) for elective colorectal surgery is not advantageous. It does not influence radicalism of the procedure, does not decrease neither postoperative complications, nor hospital mortality.

***Key words**: colorectal surgery, mechanical bowel preparation, complications,*

Introduction

Mechanical bowel preparation has been a routine and important practice in colorectal surgery. The controversy still exists[1–6]. Despite there being no evidence of the advantages of its use, mechanical bowel preparation (MBP) and/or antibiotic prophylaxis continues to be routine in colorectal surgery, and knowledge translation gives effect in changing surgeons' behavior[6–9].

The systematic reviews and meta-analysis over time did not show advantages and no statistically significant evidence that patients benefit from mechanical bowel preparation, nor the use of rectal enemas[1,2,9].

Despite MBP is still in use, it is pointed out to be less rigorous and more comfortable for the patient. The objective of this prospective study was to estimate the influence of mechanical bowel preparation on postoperative complications in elective colorectal surgery in Dubrava University Hospital, Zagreb, Croatia.

Patients and Methods

Prospective study was performed on Endoscopic Surgery Division, Dubrava University Hospital, Zagreb from January 1st 2009 – December 31st 2010 including 85 patients with colorectal carcinoma. For comparison, the data were divided in two groups: A (N=46) patients with elective operation that underwent MBP with 136 g polyethylene glycol and 2 L of water one day preoperatively; and group B (N=39) patients with elective operation without MBP.

In both groups single parenteral antimicrobial prophylaxis was administered 30–60 min before incision (combination of cefazolin 1 g and metronidazole 500 mg).

In both groups we analyzed: gender, age, preoperative difficulties, diagnostic colonoscopy, tumor localization, operation performed, pathohystological findings, Dukes classification, number of lymphonodes inspected, liver metastasis, other organ infiltrations, mean time of sur-

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TABLE 1
USE OF MECHANICAL BOWEL PREPARATION – GROUPS' CHARACTERISTISC

Variable	(Group A) MBP (N= 46)	(Group B) No MBP (N=39)	p
Gender	m=30 f=16	m=23 f=16	NS
Age (years)	67 (33–85)	66 (32–85)	NS
Preoperative difficulties			
Blood in stul	16 (35%)	14 (35%)	NS
Weight loss	10 (22%)	11 (28%)	NS
Colonoscopy	44 (96%)	37 (95%)	NS

MBP – mechanical bowel preparation

gery, length of hospital stay, postoperative complications and mortality.

There was no statistical difference in gender and age distribution, as well as in leading preoperative difficulties that patients reported (Table 1). Almost all patients underwent colonoscopy to reach the diagnosis.

Results

The most common tumor localisation was similar in both groups: sygmoid-rectosygmoid-rectum in 66% of all operated patients (56/85) (Table 2).

The most common operation for both groups was Dixon operation (30/85=35%). Most of the pathohystological findings were adenocarcinoma in both groups respectively (Table 2). We found no significance in distribution among groups concerning the Dukes classification.

The only difference was found in the number of metastasectomies performed due to liver metastasis where group A outnumbered. Yet, the number of other organ infiltrations showed no differences, as well as lymphonodes inspected (Table 2).

The only significance revealed in mean time of surgery (138/178 min) in favor of mechanical prepared bowel respectively (p=0.017).

The length of hospital stay, hospital mortality, anastomosis abruption incidence and wound infection rate did not differ (Table 3).

Discussion

Preoperative mechanical bowel preparation was developing in last five decades[6,10–13]. Ideal mechanical preparation should be safe for patients, producing as low disconfort as possible, to be applicable for all patients, but none of the methods so far is fulfilling this demands. In a group of patients we practiced MBP, 136 g polyethylene glycol and 2 l of water one day preoperatively was administered. Rovera (2006) suggests that MBP shortens time of surgery thus facilitating surgical procedure[5]. In our group with MBP operative procedure was shorter

TABLE 2
USE OF MECHANICAL BOWEL PREPARATION – DIAGNOSTICS AND OPERATIVE PROCEDURES

Variable	(Group A) MBP (N= 46)	(Group B) No MBP (N=39)	p
PHD			
Adenocarcinoma	44 (96%)	37 (95%)	NS
Adenoma tubulovillosum	2 (4%)	2 (5%)	NS
Localization			
Caecum	3 (7%)	1 (3%)	NS
Ascendent colon	7 (15%)	8 (20%)	NS
Hepatic flexure	2 (4%)	0	NS
Colon transversal	4 (9%)	0	NS
Lienal flexure	1 (2%)	0	NS
Colon descendent	1 (2%)	2 (5%)	NS
Colon sygmoid	9 (20%)	7 (18%)	NS
Rectosygmoid	1 (2%)	5 (13%)	NS
Rectum	18 (39%)	16 (41%)	NS
Operations performed			
Dixon	14 (30%)	16 (41%)	NS
Hemicolectomy right	12 (26%)	7 (18%)	NS
Resection of sygmoid colon	6 (13%)	3 (8%)	NS
Milles	6 (13%)	6 (16%)	NS
Hemicolectomy left	3 (7%)	2 (5%)	NS
Colectomy sub/totalis	3 (7%)	1 (3%)	NS
Hartman	1 (2%)	1 (3%)	NS
Resection of transvesral colon	1 (2%)	0	NS
Proctocolectomy	0	1 (3%)	NS
Sygmoidostomy	0	2 (6%)	NS
Dukes classification			
A	11 (24%)	10 (26%)	NS
B	14 (30%)	10 (26%)	NS
C	10 (22%)	11 (27%)	NS
D	11 (24%)	8 (21%)	NS
Liver metastasis and operations	5 (11%)	6 (15%)	NS
Metastasectomy	4 (80%)	1 (16%)	0.036
Segmentectomy	1 (20%)	1 (16%)	NS
Bisegmentectomy	0	1 (16%)	NS
Lobectomy	1 (20%)	0	NS
Other organ infiltrations and operations	5 (11%)	4 (10%)	NS
Bladder partial resection	2 (40%)	1 (25%)	NS
Jejunum and omentum partial resection	1 (20%)	0	NS
Diaphragm partial resection	1 (20%)	0	NS
Ileum and appendix partial resection	1 (20%)	1 (25%)	NS
Hysterectomy	0	1 (25%)	NS
Adnexectomy dex	0	1 (25%)	NS
No. of lymphonodes inspected	12 (2–48)	14 (1–61)	NS

MBP – mechanical bowel preparation; PHD – pathohystological diagnosis

TABLE 3
USE OF MECHANICAL BOWEL PREPARATION – RESULTS

Variable	(Group A) MBP (N= 46)	(Group B) No MBP (N=39)	p
Mean time of surgery	138 min (60–260)	178 min (90–360)	0.017
LOS days	11 (7–40)	10 (7–30)	NS
Hospital mortality	3 (6.5%)	1 (2.5%)	0.390
Anastomosis leakage	2 (4%)	0	NS
Wound infection	2 (4%)	1 (2.5%)	NS

MBP – mechanical bowel preparation; LOS – lenghth of stay

(138 *vs.* 178 min mean time). The conclusion implying that bowel filled with faecal masses is slowing down surgical management. However, many recent studies did not reveal the benefit of MBP[4,12–19]. The number of lymphonodes inspected in our series indicates that MBP did not influence the radicalism of the operation. In the group B without MBP with longer time of operative procedure (178 min) the mean number of lymphonodes inspected is rather higher (NS) which might speak in favor of radicalism thus extending operative procedure. MBP has no influence on LOS. Concerning the wound site infection and anastomotic leakage in our groups, the data did not differ from recent reports and meta analysis (Zmora 2006)[17].

Wille-Jorgensen (2006) assumes that routine MBP is increasing the risk of wound site infection and anastomotic leakage[9]. In our group with MBP performed the number of wound site infection and anastomotic leakage was higher (NS). Antimicrobial prophylaxis in elective colorectal surgery is in our hospital considered to be a standard and benefits the patient's outcome[3,4,6,7,16–20].

Conclusion

Mechanical bowel preparation (MBP) for elective colorectal surgery is not advantageous. It does not influence radicalism of the procedure, does not decrease neither postoperative complications, nor hospital mortality. The only warranty of a gentle MBP we used (136 g polyethylene glycol and 2 L of water one day preoperatively) is facilitating the surgical procedure and slightly decreasing the needed time.

Acknowledgements

This study has been approved by Hospital Ethical Committee of Dubrava University Hospital in Sept. 2008. Since it was not a clinical trial, but a study of standardized and routine procedure in preoperative preparation of patients, we had not found a reason to register this study in any register of clinical trials.

REFERENCES

1. GÜENAGA KF, MATOS D, CASTRO AA, ATALLAH AN, WILLE-JØRGENSEN P, Cochrane Database Syst Rev, 2 (2003), DOI: CD001544; PMID:12804412. — 2. GÜENAGA KF, MATOS D, WILLE-JØRGENSEN P, Cochrane Database Syst Rev, 7:9 (2011), DOI: CD001544;PMID: 19160198. — 3. BUSINGER A, GRUNDER G, GUENIN MO, ACKERMANN C, PETERLI R, VON FLUE M, Langenbecks Arch Surg, 1 (2011) 107. — 4. ESKICIOGLU C, FORBES SS, FENECH DS, MCLEOD RS, Can J Surg, 6 (2010) 385. — 5. ROVERA F, DIONIGI G, BONI L, FERRARI A, BIANCHI V, DIURNI M, CARCANO G, DIONIGI R, Surg Infect, 7 (2006) 61. — 6. ESKICIOGLU C, GAGLIARDI A, FENECH DS, VICTOR CJ, MCLEOD RS, Surgery, 150 (2011) 68. — 7. HOWARD DD, WHITE CQ, HARDEN TR, ELLIS CN, Am Surg, 75 (2009) 659. — 8. XIA Y, YANG Z, CHEN HQ, QIN HL, Zhonghua Wei Chang Wai Ke Za Zhi, 13 (2010) 528. — 9. WILLE-JØRGENSEN P, GUENAGA KF, MATOS D, CASTRO AA, Colorectal Dis, 7 (2005) 304. — 10. ITANI KM, WILSON SE, AWAD SS, JENSEN EH, FINN TS, ABRAMSON MA, Am J Surg, 193 (2007) 190. — 11. BERTANI E, CHIAPPA A, BIFFI R, BIANCHI PP, RADICE D, BRANCHI V, SPAMPATTI S, VETRANO I, ANDREONI B, Colorectal Dis, 13 (2011) e-327. DOI: 10.1111/j.1463-1318.2011.02689.x. — 12. CIGA MA, OTEIZA F, FERNANDEZ L, DE MIGUEL M, ORTIZ H, Dis Colon Rectum, 53 (2010) 1524. — 13. ROIG JV, GARCÍA-FADRIQUE A, SALVADOR A, TORMOS B, LORENZO-LIÑÁN MÁ, GARCÍA-ARMENGOL J, Cir Esp, 89 (2011) 167. — 14. PITOT D, BOUAZZA E, CHAMLOU R, VAN DE STADT J, Acta Chir Belg, 109 (2009) 52. — 15. MATSOU A, VRAKAS G, DOULGERAKIS M, HATZIMISIOS K, ZANDES N, SALIANGAS K, Tech Coloproctol, Suppl 1 (2011) 559. DOI: 10.1007/s10151-011-0733.1. — 16. JUNG B, MATTHIESSEN P, SMEDH K, NILSSON E, RANSJO U, PAHLMAN L, Int J Colorectal Dis, 25 (2010) 439. — 17. ZMORA O, MAHAJANA A, BAR-ZAKAI B, HERSHKO D, SHABTAI M, KRAUSZ MM, Ayalon A, Tech Coloproctol, 10 (2006) 131. — 18. HARRIS LJ, MOUDGILL N, HAGER E, ABDOLLAHI H, GOLDSTEIN S, Am Surg, 75 (2009) 828. — 19. WATANABE M, MURAKAMI M, NAKAO K, ASAHARA T, NOMOTO K, TSUNODA A, Br J Surg, 97 (2010) 1791. DOI: 10. 1002/bjs.7253 — 20. ZHU QD, ZHANG QY, ZENG QQ, YU ZP, TAO CL, YANG WJ, Int J Colorectal Dis, 25 (2010) 267.

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MEHANIČKO ČIŠĆENJE CRIJEVA U KIRURGIJI KOLOREKTALNOG KARCINOMA

S A Ž E T A K

Cilj ove studije je procjena uporabe mehaničkog čišćenja crijeva (MBP) i antimikrobne profilakse u elektivnoj kirurgiji kolorektalnog karcinoma, a zbog postojećih nesuglasica u literaturi i praksi. U dvogodišnjem razdoblju proveli smo prospektivnu studiju s 85 bolesnika koji su podvrgnuti elektivnom operacijskom zahvatu na kolon i rektumu zbog maligne bolesti. Bolesnike smo podijelili u dvije skupine: skupina A (N=46) koju čine bolesnici podvrgnuti prijeoperacijskom mehaničkom čišćenju crijeva, i skupina B (N=39) koju čine bolesnici bez prijeoperacijskog mehaničkog čišćenja. Promatrali smo: spol, dob, prijeoperacijske tegobe, dijagnostičku kolonoskopiju, lokalizaciju tumora, vrstu učinjenog operacijskog zahvata, pahohistološki nalaz, klasifikaciju karcinoma po Dukes-u, broj pregledanih limfnih čvorova, metastaze u jetri, infiltracije drugih organa, prosječno vrijeme trajanja operacije, duljinu hospitalizacije, poslijeoperacijske komplikacije i smrtnost. Demografske značajke, patohistološki nalaz, lokalizacija malignoma i vrsta operacijskog zahvata nisu se statistički vjerodostojno razlikovali između dvaju promatranih skupina. Jedino je prosječno vrijeme trajanja operacijskog zahvata pokazalo statistički vjerodostojnu razliku (138/178 minuta) s kraćim vremenom kod bolesnika s učinjenim mehaničkim čišćenjem crijeva (p=0,017). Mehaničko čišćenje crijeva (MBP) kod elektivnih operacijskih zahvata na kolonu i rektumu ne daje prednosti: ne utječe na radikalnost zahvata, ne smanjuje niti broj poslijeoperacijskih komplikacija, niti smrtnost.