CHEWING GUM TO HASTEN BOWEL RECOVERY IN CESAREAN SECTION: A RANDOMIZED CONTROL TRIAL

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ABSTRACT

Objective: To evaluate the recovery of bowel function by chewing gum in comparison with standard care.
Study Design: Randomized control trial (RCT).
Place and Duration of Study: Department of Gynecology and Obstetrics, Combined Military Hospital, Okara Cantt for the duration of 6 months from Apr to Sep 2018.
Methodology: After the approval of hospital ethics committee, 100 patients undergoing elective cesarean section were divided into two groups (n=50 in each group). Group A were told to chew gum for 1 hour, four hours postoperatively in addition to standard care. Group B were the control group, with no addition of chew gum. The data were analyzed by SPSS version 20. Qualitative data presented as frequency and percentage; chi-square used to calculate significance. Descriptive data were presented as mean ± SD; T-test used to calculate significance. A *p*-value less than 0.05 was taken as significant.
Results: The two groups did not vary in their demographic profile. The mean time for auscultation of bowel sound was 6.5 hours ± 1.03 in group A versus 9.3 hours ± 1.56 in group B; *p*-value <0.05. The mean time to passage of flatus was 14.28 hours ± 3.05 in group A versus 18.3 hours ± 3.42 in group B; *p*-value <0.05.
Conclusion: Chewing gum postoperatively results in early return of bowel function, as evidenced by earlier return of bowel sounds and passage of flatus. It can be an inexpensive and convenient method for improved patient comfort and outcomes.

Keywords: Bowel sound, Chewing gum, Flatus, Post-operative bowel function.

INTRODUCTION

Postoperative ileus is defined as loss of peristaltic muscular action of intestine and stomach after surgery[1]. Delayed gut recovery can result in abdominal pain, nausea, vomiting, abdominal distension, prolonged immobilization and prolonged hospital stay as well as hospitalization cost[2,3]. Delayed recovery of bowel function is thought to be multifactorial in origin. It can be due to postoperative activation of sympathetic system; inhibition of parasympathetic nervous system; release of nitric oxide, vasoactive peptide, substance P, sustained inflammatory cell migration into gut wall; peri-operative blood loss and hypotension; electrolyte imbalance and opiate usage[4,5]. Early recovery after surgery (ERAS) protocol recommends steps to reduce post-operative ileus including: withholding routine use of naso-gastric tube; early enteral feeding in recovery process, opioid sparing and post-operative mid-thoracic epidural analgesia with local anesthetic[6]. In addition, trials with peri-operative administration of metoclopramide, magnesium sulphate, neostigmine, erythromycin, laxatives have shown unequivocal results in improvement of gut recovery and prevention on post-operative ileus[7-9]. Methylnaltrexone is being used for opioid induced constipation in palliative care patients and alvimopan is being used for prevention of post-operative ileus[10-12].

Studies have been done to evaluate chewing gum as method to reduce post-operative ileus with varied results[13]. It is an inexpensive, easy to administer and comfortable for the patient. The purpose of our study is to assess the effect of chewing gum on return of bowel functions as compared to standard management as per ERAS guidelines. If proven effective, it can help reduce

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return to enteral feed time, hospital stay, mobilization and improve patient comfort as well as hospital cost.

METHODOLOGY

After the approval of the Hospital Ethics Committee, this randomized control trial (RCT) was conducted at Department of Obstetrics and Gynecology, Combined Military Hospital, Okara Cantt; for the duration of six months from Apr to Sep, 2018. WHO sample size calculator was used to calculate sample size of 100 (n=50 in each group)[14]. Patients were divided into two groups by non-probability consecutive. Pregnant women with age 18-35 years, with BMI 18-30, presenting for elective lower segment cesarean section (LSCS) were included in our study. Patients with previous intra-abdominal gut surgery, abnormal placental implantation or placenta previa were excluded from our study. The preoperative assessment and preparation was done per institute protocol and no changes were made for the study. Patient willing for participation and fulfilling inclusion criteria were kept nill per oral (NPO) for at least 6 hours preoperative. The indication and time of LSCS was decided by either of the two classified obstetricians. All the patients were given spinal anesthesia with 10-12mg hyperbaric bupivacaine 0.75% at L3-4 level and sensory level of T4 confirmed before start of surgery. Group A were advised to chew gum for 1 hours, four hours after their surgery. Group B were taken as control group with no chewing gum. All patients were given infusion of intravenous nalbuphine 10mg with metoclopramide 10mg and intramuscular diclofenac sodium 50mg, 8 hourly for post-operative analgesia. The return of bowel function was assessed by auscultation of bowel sound in right iliac fossa on hourly basis, four hours post-operatively. Patients were asked about passage of flatus at the same time. Data were collected on a pre-determined performa. The demographic data included: age, obstetric history, previous number of LSCS, BMI, presence of pregnancy induced hypertension, gestational diabetes mellitus and place of living. Our outcome were: post-operative return of bowel sounds and time to passing flatus.

Data was analyzed using SPSS version 20. Qualitative data such as presence of co-morbidity, number of LSCS, place of living was presented as frequency and percentage. Chi square was used to calculate significance foe qualitative data. Quantitative data such as age, BMI, time to return of bowel sound and passing flatus presented as mean ± SD. Independent sample t-test was used to calculate statistical significance for quantitative data. A *p*-value ≤0.05 taken as significant.

RESULTS

A total of 100 parturient were included in our randomized control trial. The two groups

Table-I: Demographic profile of study groups.

Variable	Group A	Group B	*p*-value
	Mean ± SD	Mean ± SD	
Age (years)	27.6 ± 5.7	28.0 ± 4.3	0.273
BMI	24.6 ± 4.4	23.9 ± 3.5	0.288

Table-II: Demographic profile of study groups.

Variable		Group A, n (%)	Group B, n (%)	*p*-value
Parity	1	11 (22%)	21 (42%)	0.246
	2-3	34 (68%)	22 (44%)	
	>3	5 (10%)	7 (14%)	
Previous LSCS	0	15 (30%)	24 (48%)	0.151
	1	16 (32%)	09 (18%)	
	2-3	19 (38%)	16 (32%)	
	>3	-	1 (2%)	
Pregnancy induced Hypertension	Yes	1 (2%)	2 (4%)	0.558
	No	49 (98%)	48 (96%)	
Gestational diabetes mellitus	Yes	1 (2%)	1 (2%)	1.000
	No	49 (98%)	49(98%)	
Place of living	Rural	36 (72%)	38 (76%)	0.257
	Urban	14 (28%)	10 (20%)	

Table-III: Comparison of time to auscultation of bowel sound and passage of flatus.

Variable	Group A	Group B	*p*-value
	Mean ± SD	Mean ± SD	
Time to auscultation of bowel sound (hours)	6.5 ± 1.03	9.3 ± 1.56	0.000
Time to passage of flatus (hours)	14.28 ± 3.05	18.3 ± 3.42	0.000

didn't vary in their demographic profile, as shown in table-I & II.

There was a statistically significant difference in *p*-value regarding time to auscultation of bowel sound and passage of flatus, tabulated as table-III.

DISCUSSION

Our study has shown a significant faster recovery in the time to auscultation of bowel sound and passage of flatus when patients are given chewing gum post operatively, *p*-value <0.05. The mechanism by which chewing gum improves gut mobility is not clearly understood. It is thought to simulate feeding and improves motility in the stomach, duodenum and rectum. It addition, it is thought to trigger release of gastrointestinal hormones and secretions[15].

Abd-El-Meboud *et al* studied return of bowel function after cesarean section. They reported similar shorter time to auscultate bowel sound in patients who chewed gum, 10.9 hours + 2.7 versus 15.6 hours + 3.7 in patient with traditional care. They also reported a shorter time to pass flatus (17.9 hours versus 24.2 hours) and first bowel movement (21.1 hours versus 30 hours) and earlier discharge from hospital (40.8 hours versus 50.5 hours), all *p*-value <0.001, as compared to traditional management of clear fluids after passage of flatus and regular diet after first bowel movement[16]. However, their study group received one stick of chewing gum for 15 minutes every 2 hours post-operatively. We only allowed gum for 01 hour at 4 hours postoperative. Comparable results have been reported by other authors[14,17,18,19]. These studies used chewing gum for one hour three times a day versus one hour once only in our study design. In addition, they excluded patients with diabetes mellitus, cesarean hysterectomy from their study groups. We included patients with gestational diabetes and did not study duration of surgery or length of stay as outcomes. We utilized multimodal analgesia with IM diclofenac and nalbuphine 10mg infusion 8 hourly post-operatively vs IM diclofenac in Abd-El-Meboud study. Although there were difference in methodology, the results show similar improved bowel recovery when gum is used post cesarean section.

Marwah *et al* have also reported earlier appearance of bowel sound and first flatus in patient undergoing ileostomy closure[20]. Similarly, chewing gum has been shown to improve bowel recovery after open and laparoscopic colectomy; cystectomy; prostatectomy; gynecological procedures, liver resection as well abdominal aortic surgery[21-23]. These results don't correlate with study by Atkinson *et al* who reported comparable postoperative auscultation of bowel sound, passage of first flatus and movement (*p*-value >0.05). They also reported a worse quality of life score (EQ-5D-3L) at 6 and 12 weeks postoperative in gum chewing group; although incidence of complication remained comparable[24]. Similar results of no significant difference in early post-operative bowel recovery reported by other authors[25]. However, all these studies were done on surgeries on gastrointestinal tract; whereas we have studied cesarean delivery where gut manipulation is minimal.

Our study had certain limitations. All our patients underwent uncomplicated cesarean delivery where gut manipulation is minimal. So results cannot be generalized to all patients undergoing surgeries with previous non-cesarean surgeries or gut manipulation.

CONCLUSION

Chewing gum postoperatively results in early return of bowel function, as evidenced by earlier return of bowel sounds and passage of flatus. It is a safe and economical method that is can be utilized to improve patient comfort and reduce postoperative ileus.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

1. Venara A, Neunlist M, Slim K, barbieux J, Colas PA, Hamy A, Meurette G. Postoperativeileus: Pathophysiology, incidence, and prevention. J Visceral Surg 2016; 637(1): 1-8.

2. Iyer S, Saunders WB, Stemkowski S. Economic burden of postoperative ileus associated with colectomy in the United States. J Manag Care Pharmacol 2009; 15(6): 485-94.
3. Tevis SE, Carchman EH, Foley EF, harms BA, Heise CP, Kennedy GD. Postoperative Ileus- More than Just Prolonged Length of Stay? J Gastrointestinal Surg 2015; 19(9): 1684-90.
4. Schwarz NT, Beer-Stolz D, Simmons RL, Bauer AJ. Pathogenesis of paralytic ileus: intestinal manipulation opens a transient pathway between the intestinal lumen and the leukocytic infiltrate of the jejunalmuscularis. Ann Surg 2002; 235(1): 31–40.
5. Carroll J, Alavi K. Pathogenesis and management of postoperative ileus. Clin Colon Rectal Surg 2009; 22(1): 47-50.
6. Carmicheal JC, Keller DS, Baldini G, Bordeianou L, Weiss E, Lee L, et al. Clinical practical guidelines for enhanced recovery after colon and rectal surgery from the american society of colon and rectal surgeons and society of american gastrointestinal and endoscopic surgeons. Dis Colon Rectum 2017; 60(8): 761-84.
7. Moharari RS, Motalebi M, Najafi A, Zamani MM, Imani F, Etazadi F, et al. Magnesium can decrease postoperative physiologic ileus and postoperative pain in major non-laparoscopic gastrointestinal surgeries: a randomized controlled trial. Anesthe Pain Med 2014; 14(1): e12750.
8. Ander Spoel JI, Oudemans-van Straaten HM, Stoutenbeek CP, et al. Neostigmine resolves critical illness-related colonic ileus in intensive care patients with multiple organ failure - A Prospective, double-blind, placebo-controlled trial. Intens Care Med 2001; 27(1): 822-27.
9. Fanning J, Yu-Brekke S. Prospective trial of aggressive postoperative bowel stimulation following radical hysterectomy. Gynecol Oncol 1999; 73(1): 412-14.
10. Erowele GI, Sise T. Treatment options for Postoperative Ileus. US Pharm 2010; 35(12): 55-73.
11. Erowele GI. Alvimopan. A peripherally Acting mu-opioid receptor antagonist for postoperative Ileus. PT 2008; 33(10): 58-3.
12. Lee CT, Chang SS, Kamat AM, Amiel G, Beard TL, Fergany A, et al. Alvimopan accelerates gastrointestinal recovery afetr rdaical cystectomy: a multicentered randomized placebo-controlled trial. Eur Urol 2014; 66(2): 265-72.
13. Bragg D, El-Sharkawy AM, psaltis E, Maxwell-Armstrong CA, Lobo DN. Post-operative ileus: Recent developments in patho hysiology and management. Clin Nutr 2015; 34(3): 367-76.
14. Bhatiyani B, Pandeeswari, Bhasani D, Dhumale S. Effect of chewing gum on postoperative recovery of gastrointestinal function after gynaecological laparoscopic surgery. Int J Reprod Contracept Obstet Gynecol 2018; 7(2): 644-47.
15. Li S, Liu Y, Peng Q, Xie L, Wang J, Qin X. Chewing gum reduces postoperative ileus following abdominal surgery. A meta-analysis of 17 randomized controlled trials. J Gastroenterol Hepatol 2013; 28(7): 1122-32.
16. Abd-El-Meboud K, Ibrahim MI, Shalaby DAA, Fikry MF. Gum chewing stimulates early return of bowel motility after cesarean section. Int J Obs Gynae 2009; 116(1): 1134-39.
17. Ledari FM, Barat S, Delavar MA. Chewing gum has stimulatory effect on bowel function in patients undergoing cesarean section: a randomized controlled trial. Bosn J Basic Med Sci 2012; 12(4): 265-68.
18. Kafali H, Duvan CI, Gozdemir E, Simavli S, Onaran Y, Keskin E. Influence of gun chewing on postoperative bowel activity after cesarean section. Gynacol Obstet Invest 2010; 69(2): 84-87.
19. Jernigan AM, Chen GCC, Swell C. A randomized trial of chewing gum to prevent postoperative ileus after laparotomy for benign gynecologic surgery. Int J Gyne Obs 2014; 127(3): 279-82.
20. Marwah S, Single S, Tinna P. Role of gum chewing on the duration of postoperative ileus following ileostomy closure done for typhoid ileal perforation: a prospective-randomized trial. Saudi J Gastroeneterol 2012; 18(2): 11-17.
21. Asao T, Kuwano H, Nakamura J, Morinaga N, Hirayama I, Ide M. Gum chewing enhances early recovery from postoperative ileus after laparoscopic colectomy. J Am Coll Surg 2002; 195(1): 30-32.
22. Ge W, Chen G, Ding YT. Effect of chewing gum on the postoperative recovery of gastrointestinal function. Int J Clin Exp Med 2015; 8(8): 11936-42.
23. Jakkaew B, Charoenkwan K. Effects of gum chewing on recovery of bowel function following cesarean section: A randomized controlled trial. Arch Gynecol Obstet 2013; 288(1): 255-60.
24. Atkinson A, Penfold CM, ness AR, Longman RJ, Thomas SJ, Hollingworth W, et al. Randomized clinical trial of postoperative chewing gum versus standard care after colorectal resection. Clin Nutr 2014; 33(Suppl-1): S260.
25. Forrester DA, Doyle-Munoz J, McTigue T, D'Andrea S, Natale-Ryan A. The efficacy of gum chewing in reducing postoperative ileus: a multisite randomized controlled trial. J Wound Ostomy Continence Nurs 2014: 41(3): 227–32.
26. Lim P, Morris OJ, Nolan G, Moore S, Draganic B, Smith SR. Sham feeding with chewing gum after elective colorectal resectional surgery: A randomized clinical trial. Ann Surg 2013; 257(6): 1016–24.

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