

The Role of Gum Chewing in Regaining Bowel Motility in Patients Undergoing Cesarean Section: A randomized controlled trial

Original
Article

Mona Mohamed Shaban, Amira Dieb

Department of Obstetrics & Gynecology, Faculty of Medicine, Cairo University, Egypt

ABSTRACT

Background: Paralytic ileus is one of the problems that are faced following abdominal surgeries including caesarean section which leads to post-operative pain, abdominal distension, delayed oral feeding, prolonged hospital stay and increased hospital cost.

Objective: To assess the effectiveness of chewing gum as safe, effective and easy option to compete paralytic ileus.

Patients and Methods: One hundred sixty two parturient women who had caesarean section delivery under spinal anaesthesia were recruited and randomly allocated to two groups; group A the study group which were allowed to chew sugarless gums two hours after caesarean section for 30 minutes and repeated every two hours till auscultation of normal intestinal sounds or passage of flatus. Group B the control group underwent conventional care which is nothing per oral till audible intestinal sounds or passage of flatus. It was difficult to apply complete blindness due to the study design so the physician is only blinded. The primary outcome is the time of auscultation of first normal intestinal sounds and the secondary outcomes are time of passage of flatus, stools.

Results: Both groups were comparable regarding to their demographic data. There was a statistical significance difference between both groups regarding auscultation of first intestinal sounds, passage of flatus, passage of stools and postoperative hospital stay (*P value* 0.001, 0.001, 0.001 and 0.001, respectively). No statistical significance difference between both groups regarding presence of abdominal distension, postoperative vomiting, patient satisfaction and presence of obstetric complications.

Conclusion: The routine use of gum chewing together with early ambulation and no use of narcotics following caesarean section offers a safe, easy, effective option for early resumption of intestinal function and consecutively associated with short hospital stay.

Key Words: Bowel movement, chewing gum, CS, pregnancy

Received: 14th June 2019, **Accepted:** 27th July 2019

Corresponding Author: Mona Shabaan, M.D. Department of Obstetrics & Gynecology, Faculty of Medicine, Cairo University, Egypt, **Tel.:** 01001078586, **E-mail:** monashaban@gmail.com

ISSN: 2090-7625, November 2019, Vol.9, No. 4

INTRODUCTION

Paralytic ileus is delayed resumption of regular intestinal movements following abdominal surgeries; its mechanism is attributed to many reasons as bowel manipulation, peritoneal irritation, stimulation of pain fibers and release of inhibitory transmitter from bowel wall^[1]. That leads to post-operative pain, abdominal distension, delayed oral feeding increased hospital stay and cost.

Caesarean section (CS) is one of the commonest female surgeries that increased worldwide in the last decades especially in the developed countries^[2].

Many measures were taken to avoid facing paralytic ileus including minimal tissue handling, minimal bowel exposure, insertion of nasogastric suction tube, non-

steroidal anti-inflammatory drugs, proper hydration and early ambulation^[3].

The traditional practice following CS is to postpone oral feeding till resumption of intestinal movement which is documented by audible intestinal sounds or passage of flatus/stools to avoid paralytic ileus and its complications; however, the prolonged fasting leads to increased tissue break down, delayed wound healing and increased risk of wound infection^[4,5].

Sham feeding using chewing gum was studied by many researchers following colorectal surgeries to stimulate intestinal movements through increased vagal stimulation that lead to release of gastrointestinal hormones and increased pancreatic and duodenal secretions; it was proved to be safe, easy and

beneficial^[6-10]. However, there is a big difference between the nature and the procedure of colorectal surgeries and CS.

The aim of our study is to evaluate the effectiveness of chewing sugarless gum as a cheap and easy method following CS for early resumption of bowel motility.

PATIENTS AND METHODS

This is a randomized single blinded study which was conducted in Cairo university Maternity Hospital on 162 pregnant women who delivered by CS from June 2015 to July 2016.

All recruited women were fulfilling the following criteria:

- Age 18-35 years
- CS was done.
- Spinal anaesthesia
- Exclusion Criteria:
 - Water and Electrolyte Disturbances.
 - Pancreatitis.
 - Peritonitis.
 - History of complicated abdominal Surgery.
 - Inability to Chew Gum.
 - Diabetes.
 - Hypothyroidism.
 - Muscular and Neurological Disorders.
 - History of inflammatory bowel diseases
 - Severe Intra- and Post-Operative Complications.
 - previous abdominal or pelvic irradiation.

An informed consent was obtained from all participants and the study was approved by the ethical committee of the department.

Recruited women were randomly allocated into 2 groups by computer generated random cards ; group (A) the study group which was allowed to chew sugarless gum (SAMARA, Samara for food and Chocolates Product Company, Egypt) 2 hours after CS for 20 minutes and repeated every 2 hours. Group (B) underwent conventional care which is nothing per oral till auscultation of intestinal sounds or passage of flatus.

The assignment of women was conducted by the nurse according to their random allocation. Due to the nature of the study design, it was difficult to be double blinded ; the physician was only blinded. Under spinal anaesthesia, all CSs were done by senior residents under supervision of consultants and the abdomen opened via Pfannenstiel incision.

Auscultation of intestinal sounds was done by the physician after 6 hours post surgery (the end of surgery

was zero point) and at 2hs intervals and the time of first intestinal sound, passage of flatus and passage of stools were documented.

All women were encouraged for early ambulation and Voltaren 75mg ampoules (diclofenac sodium 75 mg/ 3 ml, NOVARTIS PHARMA S.A.E. Cairo, under license from: Novartis Pharma AG, Basle, Switzerland) was given Intramuscular (IM) when needed for post-operative analgesia.

Statistical analysis:

The results were expressed as mean \pm standard deviation (SD) or number (%). Comparison between categorical data [number (percent)] was performed using Chi square test. Comparison between variables in the two groups was performed using unpaired t-test. Statistical Package for Social Sciences (SPSS) computer program (version 19 windows) was used for data analysis. *P value* \leq 0.05 was considered significant.

On auscultation of intestinal sounds, women were allowed to take sips of clear fluids till passage of flatus or stools then regular diet was allowed.

Hospital discharge was allowed after 24-48hs when the patient passed flatus and stools, no abdominal distension, completely ambulant, tolerating food, no fever (<38.5) for 24hs and no surgical complications.

The primary outcome of our study was the time of auscultation of first intestinal sounds, while the secondary outcomes were time of passage of flatus, stools and patient satisfaction.

Sample size calculation was done based on time to normal intestinal sounds, time to 1st flatus and time to 1st defecation compared between cases who chewed gum and those without chewing gums after CS operation. Student's t-test for independent samples was chosen, α -error level was fixed at 0.05, the power at 80% and the groups are assumed to be of equal size. Using previous results, the mean \pm SD of time to normal intestinal sounds in gum chewing group was reported to be 21.9 ± 7.8 hours, while in no chewing gum group it was 26.1 ± 9.5 hours^[11]. Accordingly, we needed to study a minimum of 81 women in each group to achieve the presumed statistical power. Similarly, the previously reported time to 1st flatus in chewing gum group was 24.8 ± 6.4 hours and in non-chewing gum groups was 30 ± 9.7 hours^[11]. Accordingly, the minimum sample size per group was 56 women. Regarding time to 1st defecation, the previously reported mean \pm SD was 30.7 ± 5.9 in gum group and 38.4 ± 8.9 in no gum group^[11] resulted in a minimum sample of 24 women in each study arm. Calculations

were done using PS Power and Sample Size Calculations Software, version 3.0.11 for MS Windows, (William D. Dupont and Walton D. Vanderbilt, USA).

RESULTS

Both groups were comparable regarding to their demographic data which is shown in Table 1.

Table 2 shows that there was ab difference of statistical significance between both groups regarding

auscultation of first intestinal sounds, passage of flatus and passage of stools (*P value* 0.001,0.001,0.001, respectively).

Table 3 shows other different patient findings as presence of abdominal distension, postoperative vomiting, postoperative ileus, postoperative hospital stay, prior abdominal surgery, patient satisfaction, presence of obstetric complications and both groups were compared

Table (1): The demographic features of the two studied groups

	Study (n= 81)	Control (n= 81)	<i>P value</i>
Age (yrs)	27.17 ± 5.28	27.85 ± 5.10	0.407
Gestational age(wks.)	38.38 ± 0.99	38.20 ± 1.04	0.267
BMI (kg/m2)	35.30 ± 3.51	35.05 ± 3.12	0.637
Parity	1.57 ± 1.08	1.58 ± 1.29	0.948
Duration of surgery (min)	40.04 ± 5.20	40.04 ± 5.65	1.000

Data are expressed as mean ± SD.
P > 0.05= not significant.

Table 2: The primary and secondary outcomes in the two studied groups

	Study (n= 81) (mean± SD)	Control (n= 81) (mean± SD)	<i>P value</i>
First intestinal sound	6.56 ± 0.59	11.73 ± 1.10	0.001*
Passage of flatus	10.62 ± 1.18	18.98 ± 1.94	0.001*
Passage of stools	17.44 ± 2.29	26.62 ± 4.58	0.001*

**p* < 0.05= significant.

Table 3: Other post operative findings in the two studied groups

	Study (n= 81)	Control (n= 81)	<i>P value</i>
Abdominal distension (yes)	8 (9.9%)	12 (14.8%)	0.339
Postoperative vomiting (yes)	0 (0.0%)	4 (4.9%)	0.043
Postoperative ileus (yes)	0 (0.0%)	0 (0.0%)	----
Postoperative hospital stay (hr.)	26.37 ± 6.13	37.04 ± 6.63	0.001*
Prior abdominal surgery	1.27 ± 1.06	1.38 ± 1.17	0.527
Patient satisfaction (yes)	81 (100.0%)	81 (100.0%)	----
Obstetric complications (NO)	81 (100.0%)	81 (100.0%)	----

Data are expressed as mean ± SD or number (%).
P > 0.05= not significant.
 **p* < 0.05= significant

DISCUSSION

Many studies had assessed the practice of early feeding following caesarean section for early resumption of intestinal function^[12-16] but it wasn't tolerated by some patients; so came the idea of sham feeding by chewing gums to stimulate the resumption of intestinal function through vagal stimulation that lead to increased pancreatic and duodenal secretions.

The results of our study have found that chewing sugarless gum after caesarean section can significantly promote the recovery intestinal function by accelerating the time to first normal intestinal sounds, first passage of flatus, first defecation and shortening the length of hospital stay which went in agreement with many studies^[17-23].

Abd-El-Maeboud *et al.* 2009 studied the efficiency of gum chewing for fifteen minutes every two hours on 93 women who had caesarean section under general anesthesia and found that it helps early resumption of intestinal motility and shorten hospitalisation^[17].

Safdari *et al.* 2014, had studied the benefit of gum chewing 4 times daily following CS on sixty women and found that there was rapid resumption of intestinal function with short hospitalisation^[18].

Ledari *et al.* 2012, investigated the effect of gum chewing three times daily for one hour post cesarean section on early restoration of intestinal motility on fifty women and found that it is safe and effective^[19].

Rashad *et al.* 2013 used gum chewing three times daily for thirty minutes on thirty parturient women who delivered by CS and concluded that it helped in early resumption of intestinal function^[20].

A study by Terzioglu 2015, compared the impact of gum chewing, early oral hydration and early mobilization on recovery of intestinal motility after cesarean section found that all of them promoted intestinal movement, and can be applied during routine postoperative care to shorten hospitalion and avoid postoperative ileus^[22].

Our study in agreement with all of the above, but the time of hearing first intestinal sounds, passage of gas and passage of stools were significantly shorter than others which may be attributed to all of our parturient had regional (spinal) anesthesia no use of post operative narcotics only non-steroidal anti inflammatory drugs were used and early ambulation was a mandatory in all parturients.

Also, most studies have relatively small number of women that is not enough to recognize small differences between groups; this consequently adds to strength of our study, in addition, we used gum chewing more frequently than other previous studies.

Many meta-analysis of randomized controlled trials (RCTs) on the effectiveness of gum chewing following caesarean delivery were done and encountered several limitations. Firstly, the variation in gum chewing interventions (e.g., initiation, ingredients and frequency) among included RCTs which explains the heterogeneity observed and no meta-regression analyses on patient population characteristics was done. Secondly, most included RCTs did not report on the randomization method and blinding, due to the characteristic of the study, as blinding the participants in this study setting is not practical, yet blinding the health assessor is achievable to reduce the bias. Thirdly, subgroup analysis as well as funnel plot in some outcomes were not done, though it's possible that the end point susceptible to missing data from studies that were not published due to an overall null effect^[21,23].

A careful study design was done by randomizing the patients into two groups using computer generated randomization system that was fulfilled by a skilled nurse. Also, we used one kind of gum, same onset, duration and interval of gum chewing for all patients. The blinding was applicable to the health assessor and both control and test groups have a non-significant differences in their demographic features.

We did not examine the benefits of gum chewing on the time to first feeling of hunger which was intended as chewing movement causes a feeding feedback to the brain making a full feeling for the brain which cannot be assessed.

As regards the type of gum used for prevention of postoperative paralytic ileus, we used sugar free Samara gum. A RCT evaluated the effects of xylitol-containing and xylitol-free gum chewing on bowel recovery after cesarean section. They found that xylitol-containing gum could be better than xylitol-free gum, while the most RCTs used the sugar-free gum. In sugar free gum, sorbitol and xylitol may stimulate intestinal movement and produce a laxative effect. However, the evidence on impact of sugar substitutes on bowel function remain insufficient^[24,25].

We did not report any side effects of gum chewing as an intervention in parturients following caesarean section; therefore, gum chewing may be considered as a safe and feasible intervention for accelerating the intestinal recovery in women after caesarean section delivery ;this agrees with other studies and meta-analyses^[26].

On the other side, other studies in disagreement with our results and this can be attributed to the nature of surgery were applied on colorectal surgeries with the marked difference between it and CS as regarding the operative time and technique^[9,27,28].

The authors are aware of several limitations in this study. Firstly, the blinding was only applicable on the health assessor (physician) due to the nature of the study, Secondly, the inclusion and exclusion criteria limits the wider use of chewing gums as part of routine postoperative care. Thirdly, a clear definition of postoperative illness and measurement scales for patients satisfaction should be followed for more consistent results.

CONCLUSION

We concluded that the routine use of gum chewing together with early ambulation and no use of narcotics following caesarean section offers a safe ,easy, effective option for early resumption of intestinal function and consecutively short hospital stay.

AKNOWLEDGMENT

To all patients who accepted to participate in our study and to all Cairo University Hospital staff members.

CONFLICT OF INTEREST

There are no conflicts of interest.

REFERENCES

- Kalff JC, Schraut WH, Simmons RL, Bauer AJ. Surgical manipulation of the gut elicits an intestinal muscularis inflammatory response resulting in postsurgical ileus. *Annals of surgery*. 1998;228(5):652.
- Sufang G, Padmadas SS, Fengmin Z, Brown JJ, Stones RW. Delivery settings and caesarean section rates in China. *Bulletin of the World Health Organization*. 2007;85:755-62.
- Holte K, Kehlet H. Postoperative ileus: a preventable event. *British Journal of surgery*. 2000;87(11):1480-93.
- Steed HL, Capstick V, Flood C, Schepansky A, Schulz J, Mayes DC. A randomized controlled trial of early versus "traditional" postoperative oral intake after major abdominal gynecologic surgery. *American journal of obstetrics and gynecology*. 2002;186(5):861-5.
- Pearl ML, Frandina M, Mahler L, Valea FA, DiSilvestro PA, Chalas E. A randomized controlled trial of a regular diet as the first meal in gynecologic oncology patients undergoing intraabdominal surgery. *Obstetrics & Gynecology*. 2002;100(2):230-4.
- Asao T, Kuwano H, Nakamura J-i, Morinaga N, Hirayama I, Ide M. Gum chewing enhances early recovery from postoperative ileus after laparoscopic colectomy1. *Journal of the American College of Surgeons*. 2002;195(1):30-2.
- Hirayama I, Suzuki M, Ide M, Asao T, Kuwano H. Gum-chewing stimulates bowel motility after surgery for colorectal cancer. *Hepato-gastroenterology*. 2006;53(68):206-8.
- Ho YM, Smith SR, Pockney P, Lim P, Attia J. A meta-analysis on the effect of sham feeding following colectomy: should gum chewing be included in enhanced recovery after surgery protocols? *Diseases of the Colon & Rectum*. 2014;57(1):115-26.
- Su'a BU, Pollock TT, Lemanu DP, MacCormick AD, Connolly AB, Hill AG. Chewing gum and postoperative ileus in adults: a systematic literature review and meta-analysis. *International Journal of Surgery*. 2015;14:49-55.
- Purkayastha S, Tilney HS, Darzi AW, Tekkis PP. Meta-analysis of randomized studies evaluating chewing gum to enhance postoperative recovery following colectomy. *Archives of Surgery*. 2008;143(8):788-93.
- Shang H, Yang Y, Tong X, Zhang L, Fang A, Hong L. Gum chewing slightly enhances early recovery from postoperative ileus after cesarean section: results of a prospective, randomized, controlled trial. *American journal of perinatology*. 2010;27(05):387-91.
- Patolia DS, Hilliard Jr RL, Toy EC, Baker III B. Early feeding after cesarean: randomized trial. *Obstetrics & Gynecology*. 2001;98(1):113-6.
- Göçmen A, Göçmen M, Saraoğlu M. Early post-operative feeding after caesarean delivery. *Journal of International Medical Research*. 2002;30(5):506-11.

14. Adupa D, Wandabwa J, Kiondo P. A randomised controlled trial of early initiation of oral feeding after caesarean delivery in Mulago Hospital. *East African medical journal*. 2003;80(7):345-50.
15. Charoenkwan K, Palapinyo C. Early solid food after cesarean section and postoperative ileus. *International Journal of Gynecology & Obstetrics*. 2005;90(2):144-5.
16. Kovavisarath E, Atthakorn M. Early versus delayed oral feeding after cesarean delivery. *International Journal of Gynecology & Obstetrics*. 2005;90(1):31-4.
17. KHI A-E-M, MI I, DAA S, MF F. Gum chewing stimulates early return of bowel motility after caesarean section. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2009;116(10):1334-9.
18. Safdari Dehcheshmeh F, Salehian T, Ganji F, Beigi M. The effect of chewing sugar free gum after elective cesarean-delivery on return of bowel function in primiparous women. *Qom Univ Med Sci J*. 2011;4(4).
19. Ledari FM, Barat S, Delavar MA. Chewing gums has stimulatory effects on bowel function in patients undergoing cesarean section: a randomized controlled trial. *Bosnian journal of basic medical sciences*. 2012;12(4):265.
20. Rashad WAE-H, Suliman A, Yousef A. Effect of sugarless gum chewing on intestinal movement after cesarean section. *Life Sci J*. 2013;10(4):3257-61.
21. Zhu YP, Wang WJ, Zhang SL, Dai B, Ye DW. Effects of gum chewing on postoperative bowel motility after caesarean section: a meta-analysis of randomised controlled trials. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2014;121(7):787-92.
22. Sahin E, Terzioglu F. The effect of gum chewing, early oral hydration, and early mobilization on intestinal motility after cesarean birth. *Worldviews on Evidence-Based Nursing*. 2015;12(6):380-8.
23. Craciunas L, Sajid M, Ahmed AS. Chewing gum in preventing postoperative ileus in women undergoing caesarean section: a systematic review and meta-analysis of randomised controlled trials. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2014;121(7):793-800.
24. Storey D, Lee A, Bornet F, Brouns F. Gastrointestinal tolerance of erythritol and xylitol ingested in a liquid. *European journal of clinical nutrition*. 2007;61(3):349.
25. Tandeter H. Hypothesis: hexitols in chewing gum may play a role in reducing postoperative ileus. *Medical hypotheses*. 2009;72(1):39-40.
26. Wen Z, Shen M, Wu C, Ding J, Mei B. Chewing gum for intestinal function recovery after caesarean section: a systematic review and meta-analysis. *BMC pregnancy and childbirth*. 2017;17(1):105.
27. 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. *Annals of surgery*. 2013;257(6):1016-24.
28. Forrester DAT, 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. *Journal of Wound Ostomy & Continence Nursing*. 2014;41(3):227-32.