

The Effect of Chewing Gum on Return of Bowel Activity after Caesarean Section: A Randomized Controlled Study

¹Shahla Manzoor, ²Asma Hameed, ³Wajida Tayyab, ⁴Sobia Nawaz, ⁵Aamir Afzal

¹YUSRA General Hospital, Rawalpindi, ²Benazir Bhutto Medical College, Mirpur, ³YUSRA General Hospital, Rawalpindi, ⁴DHQ Hospital, Rawalpindi, ⁵Statistician, Foundation University Islamabad

Correspondence: Dr Shahla Manzoor

FCPS Obs & Gyane

YUSRA General Hospital, Rawalpindi.

shahla_manzoor84@yahoo.com

Abstract

Objective: To compare mean time to return of bowel motility and passage of first flatus after elective caesarean section between gum chewing and control group.

Study Design: Randomized controlled study

Place and Duration: Department of Obstetrics and Gynecology, DHQ Teaching Hospital, Rawalpindi, from 30th Dec, 2016 to 30th Jun, 2017.

Methodology: After taking approval from the Ethical Review Committee of DHQ hospital and permission from all concerned authorities, study was initiated. All patients fulfilling the above mentioned inclusion criteria were explained the purpose and procedure of the study. Written informed consent was taken from the patient. A detailed history was taken and thorough physical examination was performed. Women were randomized by lottery method into two groups; group A (gum-chewing group) who had received one stick of sugar free gum for 15 minutes every 2 hours after surgery, and group B had a control group (non gum-chewing group). The two groups were followed up postoperatively and were monitored and compared for return of bowel activity by auscultation of bowel sounds every 2 hours and recording time to first pass of flatus.

Results: Total 160 patients were included in the study according to the inclusion criteria of the study. Mean age (year) was 25.39±3.60. Mean time to return of bowel motility after elective caesarean section in both the group was 7.23±1.06 and 27.00±1.03 which was statistically significant (p-value 0.000). Similarly, mean time of passage of flatus after elective caesarean section in both the group was 8.39±0.94 and 28.15±1.13 which was statistically significant (p-value 0.000).

Conclusion: The study concludes that mean duration of appearance of return of bowel motility and mean time of passage of stool after elective caesarean section in patients of chewing gum group was less than in control group. Thus, at the very least, gum-chewing immediately after surgery is more effective and harmless intervention to reduce postoperative ileus

Keywords: Bowel Motility, Caesarean Section, Gum Chewing,

Cite this article as: Manzoor S, Hameed A, Tayyab W, Nawaz S, Afzal A. The Effect of Chewing Gum on Return of Bowel Activity after Caesarean Section: A Randomized Controlled Study J. Soc. Obstet. Gynaecol. Pak. 2018; Vol 8(4):255-260.

Introduction

Caesarean section is the one of the common abdominal surgery performed in gynaecology and Obstetrics.¹ It is associated with many complications,

One of the most common problem is postoperative Ileus (POI).³ Postoperative ileus refers to the brief cessation of normal gastrointestinal motility following

Authorship Contribution: ¹Data Collection, Manuscript revision, ^{2,4}Manuscript Drafting, ³Active participation in active methodology, ⁵Data analysis & interpretation of results

Funding Source: none

Conflict of Interest: none

Received: July 6, 2018

Accepted: Dec 27, 2018

abdominal surgery, typically lasting for three to five days.^{1,2} POI presents with abdominal pain, distension, nausea, vomiting, inability to start oral intake, delay in postoperative mobilization, slow postoperative recovery and eventually increase the length of hospital stay.^{1,2,4} The physiological pathway of POI includes local and spinal sympathetic neural reflexes, local and systemic inflammatory mediators. Additional factors include anesthetic drugs (atropine, halothane, enflurane), drug interaction, intraperitoneal surgery, opioid analgesics, excessive bowel manipulation and postoperative hypokalemia.^{1,2,3}

Up till now, no fixed cure for POI has been permitted by the United States Food & Drug Administration.² However different methods such as early nursing, intravenous fluids, nasogastric suctioning, local analgesia, reduced intravenous drug consumption, decreased surgical handling, use of cyclo-oxygenase inhibitors are recommended to reduce postoperative ileus.^{2,4} Data were available for 126 countries, the rate of cesarean section was estimated to be 15% in a study. The rates of cesarean section is lower in developing countries, whereas higher in the Caribbean, Latin America and other developed countries.¹⁰ In the US, 37% of the total cesarean sections have been accounted for repeat caesarian deliveries. The proportion of caesarean section in the US is the highest in the world as compared to other developed countries.¹¹

Postoperative ileus (POI) refers to the inability to tolerate oral intake and extreme constipation that results from a nonautomated insult and it disturbs the activity of gastrointestinal tract that is related to normally coordinated propulsive motor activity.¹²⁻¹³ An overall consensus among surgeons is that a compulsory, normal and physical reaction to the abdominal surgery is always accompanied by POI.¹⁴ Nonabdominal surgery and related mechanisms are a cause of Paralytic ileus, such as pelvic surgery, knee surgery, spinal surgery, basal lung consolidation, drug use and generalized or localized peritonitis.¹⁴ In the USA, the per year cost of POI is likely to be \$5000 to \$10 000 or a \$1 billion per year due to an extended hospital stay, discomfort and increase in the cost of treatment.¹⁵ There is 10–15% (range of 5–25%) incidence of POI after a gynaecological surgery.¹⁶ There are multidimensional causes and pathogenesis of POI; therefore, a multifaceted method is required to

counter the effects of POI. These methods consist of gentle bowel handling; preoperative optimization; early feeding; preventing the unnecessary nasogastric tubes usage; use of pharmacological agents that are soluble in water, thoracic epidural analgesia; alvimopan (l-receptor selective opioid antagonist), ketorolac and misoprostol; and gum chewing.¹⁷

To speed up the gut function soon after abdominal surgery, chewing gum is used as a form of false feeding that leads to nervous and humoral stimulation of bowel motility. After chewing, this response takes place in order to prepare the gut for the food.¹⁸ Various better results such as early bowel sounds, early flatus and shorter length of hospital stay are all associated with the chewing gum that is taken after selective intestinal resection. Previous studies have reported contradictory results in regard of the effectiveness of chewing gum in order to prevent POI. Furthermore, there is a scarcity of data to support the reduced expenses and reduced clinical difficulties.¹⁹

Procedures such as early ambulation, epidural anesthesia, less intrusive procedures such as laparoscopy, decompression of nasogastric tube and early oral intake are used in the clinical settings in order to decrease the time duration of POI.²⁰ The high prevalence of POI is still a problem to be solved, so these procedures have a limited effect. Furthermore, Vermeulen et al. conducted a meta-analysis that highlights patient comfort that is based on available suggestion. The bowel motility in humans is aroused by false feeding as per reported. Food digestion is stimulated by chewing gum which is a form of false feeding. Several studies have supported the fact that chewing gum results in a short duration of POI.²¹ Though, insignificant results were found in other studies.²² The discrepancy in the evidence creates a doubt about the effectiveness of chewing gum in decreasing the time duration of POI.

In several meta-analysis²³, gum chewing has been seen effective on time to defecation and flatus. Since those studies have a very small number size e.g. not more than 9 trials, and the results of the studies were not strong. For that reason, we have performed a meta-analysis of several randomized control trials (RCTs) in order to critically assess if, after abdominal surgery, the gum chewing helps to decrease the duration of POI. If any, the results may bring in

providing a well-tolerated, economical and commonly accessible way out to an old problem.²³

In past years, gum chewing has emerged as a simple and economical method for reducing POI. It acts by exciting intestinal motility through cephalic-vagal reflex. It also increases the levels of neural and humoral factors associated with bowel motility.^{2,4,6} Gum chewing causes the stomach stimulation, gastric and digestive juice secretions and thus it increases the eating process and stimulates the bowel movement which helps in speeding up the ileus recovery.^{2,6,7}

Over the last years, gum chewing is found to be an effective intervention in stimulating the bowel activity with a decreased risk of aspiration and vomiting and it is considered a fake feeding.⁷ Since the obstetricians traditionally withhold postoperative oral intake after caesarean section until the return of bowel function leading to delay in recovery. Gum chewing subsequent to c-section usually go along with reducing the time of passage of stool, movement of bowel, hunger feeling, and no complication has been reported.^{1,2} In one study by Ertas IE et al, the mean time to stool or flatus was 34.0 ± 11.5 hr in chewing gum group and 43.6 ± 14.0 hr in control group. Similarly, mean time to bowel movement was 41.5 ± 15.7 hr in chewing gum group and 50.1 ± 5.9 hr in control group.⁹

Methodology

The study was carried out in a government tertiary care hospital; at Department of Obstetrics and Gynecology at DHQ Teaching Hospital Rawalpindi. It is a randomized control study. The duration of the study was 06 months after the approval of synopsis i.e. 30th Dec 2016 to 30th Jun 2017. Non probability consecutive sampling was used for the patient's data collection in the study. Total 80 patients in each group were taken as sample size by using WHO sample size calculator; a level of significance 5%, the power of test as 80%, population pooled standard deviation:10.8, test value of the population mean : 34.0⁹ & anticipated population mean is 43.6⁹.

Meantime to return of bowel motility refers to the mean time to first hearing of normal intestinal sounds after surgery by stethoscope whereas chewing gum was considered as a soft, cohesive substance intended for chewing but not swallowing. Passage of

first flatus was termed as time to passage of first flatus after surgery, measured as mean time in hours. All the patients of reproductive age (16 to 45 years) undergoing elective cesarean section under spinal anesthesia were included. All those patients who were included in the study were evaluated and detail history including past medical and socioeconomic was taken. Patients who have the following problems were excluded in the study i.e history of drug intake, especially opioids, and electrolyte disturbances, patients with peritonitis or pancreatitis, history of abdominal surgery except caesarean section, any intra- and post-operative difficulties, an inability to chew gum (any dental problem), medical disorders like diabetes, preeclampsia, hypothyroidism renal disease and muscular and neurological disorders. Emergency cases of caesarean section were also excluded. After taking approval from the Ethical Review Committee of RMC and permission from all concerned authorities, study was initiated. All patients fulfilling the above mentioned inclusion criteria were explained the purpose and procedure of the study. Informed consent was taken from the patients in written form. A detailed history was taken and thorough physical examination was performed. Women were randomized by lottery method into two groups; group A (gum-chewing group) who had received one stick of sugar free gum for 15 minutes every 2 hours after surgery, and group B had a control group (non gum-chewing group) no treatment was given other than standard post-operative care. The two groups were followed up postoperatively and were monitored and compared for return of bowel activity by auscultation of bowel sounds every 2 hours and recording time to first pass of flatus. The patients of both groups were offered similar postoperative analgesic and antiemetic drug on need and requirement. The bowel sounds were auscultated by third-year postgraduate trainee and while assessment she was not aware of the study group allocated to that patient. The time (in hours) for the return of bowel sounds and first passage of flatus was noted.

Data was analyzed using descriptive statistics using SPSS version 16.0. Mean duration since appearance of first bowel sound and mean duration of passage of first flatus by patient postoperatively for both study groups were calculated along with standard deviations. Independent samples t-test was applied at

5 % level of significance to compare the mean duration for both study groups and $p\text{-value} \leq 0.05$ were considered as the statistically significant.

Results

Data was entered and analyzed in SPSS version 16.0. Total 160 patients were included in the study according to the inclusion criteria of the study. Patients were randomly divided into two equal groups. Group A (gum-chewing group) who received one stick of sugar free gum for 15 minutes every 2 hours after surgery, and group B was a control group (non gum-chewing group). Descriptive statistics of age (years) was calculated in terms of mean and standard deviation. Mean age (year) was 25.39 ± 3.60 . Mean time to return of bowel motility after elective caesarean section between gum chewing and control group was the outcome of the study. Mean time to return of bowel motility after elective caesarean section in both the group was 7.23 ± 1.06 and 27.00 ± 1.03 which was statistically significant ($p\text{-value} 0.000$) showing that mean duration of appearance of return of bowel motility after elective caesarean section in patients of chewing gum group was less than in control group. Similarly, mean time of passage of flatus after elective caesarean section between gum chewing and control group was the second outcome of the study. Meantime of passage of first flatus after elective caesarean section in both the group was 8.39 ± 0.94 and 28.15 ± 1.13 which was statistically significant ($p\text{-value} 0.000$) showed that mean duration of appearance of first passage of flatus after elective caesarean section in patients of chewing gum group was less than in control group, as shown in table no I.

Table no I: Descriptive statistics of variables		
		Mean+SD
Age (years)		25.39 ± 3.60
Return of Bowel Motility*	Chewing Gum Group	7.23 ± 1.06
	Control Group	27.00 ± 1.03
Time of first pass of flatus*	Chewing Gum Group	8.39 ± 0.94
	Control Group	28.15 ± 1.13
* $P < 0.05$ was taken as level of significance		

Discussion

The most important factor that affects discharge and speedy recovery in patients who experience complete

open staging gynecological surgery for malignancies is a delay in returning to the normal bowel functioning after surgery. The prolonged stay in the hospital increases the risk of developing infections acquired in the hospital, pulmonary compromise, deep vein thrombosis and total cost of hospital.⁹ Procedures such as gum chewing, sufficient pain control, laparoscopic surgery, epidural anesthesia, drugs including erythromycin, metoclopramide, alvimopan, neostigmine and some supportive measures including intravenous fluids, nasogastric decompression and early enteral feeding have been applied for managing the bowel functioning. After the gastrointestinal surgery, caesarean section and radical cystectomy, the most simple, harmless and economical intervention for early bowel recovery is gum chewing. However, studies have not explored the positive effects of gum chewing on the regular gastrointestinal functioning in patients experiencing systematic retroperitoneal lymphadenectomy and elective total abdominal hysterectomy.⁹

The most common surgery that leads to postoperative changes and linked to central nervous system (CNS) in women is the caesarean section that leads to a decrease in bowel activity and related difficulties among women.²⁴ Postoperative ileus is referred as the brief termination of corresponding bowel motility after the surgery procedures. It is considered as one of the major problems after the abdominal surgery accompanied by abdominal pain, abdominal swelling, delayed hospital stay, failure to start breastfeeding and oral feeding and tend to increase the hospital care cost. Postoperative ileus has multifaceted causes and pathogenesis, but it is very common in cases such as the drug and narcotic interaction after operation and surgical procedures related to abdomen particularly the bowel manipulation during surgery and for the time being, it terminates the bowel movement; this mechanism is related to some dysfunction in the parasympathetic system activity of inhibited neurons. In history, the professionals in the field of obstetrics and gynecology waited for the return of gut function that allows the entered or oral feeding, categorized by symptoms including stool, bowel sounds and hunger feelings. The stool or first passage of flatus is a clear indication of the return of bowel functioning after surgery. Studies revealed that before the return of stool or flatus, the early feeding

after surgery is safe.²⁵ Whereas, some researchers reported that early feeding is linked to an increased rate of intolerance; for an instance, delayed feeding might cause an increase in the breakdown of cells, a delay in wound healing process, an increase in the risk of acquiring infections and a need for increased intravenous feeding, and ultimately surplus cost on the family and the health care system.²⁶

Chewing gum helps in stimulating the stomach, enhances bowel movements, increases gastric secretion, and helps in speedy recovery from ileus.²⁷ Investigators have recently considered chewing gum as an active intervention towards ileus reduction. Some of the recent studies have proved that the chewing gum helps in the resumption of the bowel movement but some other studies have contradictions to these findings. A study conducted by Quah et al²⁸ has contradictory findings related to the effects of chewing gum on bowel activity and stomach stimulation. There is a need to investigate more on such an economical and simple physiological method that helps in stimulating the bowel functioning. In our study, mean age (year) was 25.39 ± 3.60 with ranges from 18 to 34 years. In a study conducted by Ertas et al⁹, mean age of patients was found to be 52.7 ± 11.2 years. Similarly, the study conducted in 2009⁹ showed that mean time to bowel movement was 41.5 ± 15.7 hr in chewing gum group and 50.1 ± 5.9 hr in control group. Whereas in our study, mean time to return of bowel movement after elective c-section in both control group and gum chewing was 7.23 ± 1.06 and 27.00 ± 1.03 whereas our study findings showed that mean time of passage of first flatus after elective caesarean section in chewing gum group was 8.39 ± 0.94 and in control group was 28.15 ± 1.13 . In one study by Ertas et al⁹, the mean time to stool or flatus was 34.0 ± 11.5 hr in the chewing gum group and 43.6 ± 14.0 hr in the control group.

Conclusion

The study concludes that mean duration of appearance of return of bowel motility and mean time of passage of flatus after elective caesarean section in patients of group that used chewing gum was fewer than in control group. Thus, gum chewing is the most economical, simple and harmless intervention to reduce the postoperative ileus, when used immediately after the surgery. This will help in

formulating a recommendation to incorporate it in routine postoperative care following c-section.

References

1. Ledari FM, Barat S, Delavar MA, Banihosini SZ, Khafri S. Chewing Sugar-Free Gum Reduces Ileus After Caesarean Section in Nulliparous Women: A Randomized Clinical Trial. *Iran Red Crescent Med J.* 2013;15:331-34.
2. Mrwah S, Singla 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 Gastroenterol.* 2012; 18: 111-17.
3. Tandeter H. Hexitols in chewing gum may play a role in reducing postoperative ileus. *Med Hypotheses.* 2009;72:39-40.
4. Vasquez W, Hernandez AV, Garcia-Sabrido JL. Is gum chewing useful for ileus after elective colorectal surgery? A systematic review and meta-analysis of randomized clinical trial. *J Gastrointest Surg.* 2009;13:649-56.
5. Noble EJ, Harris R, Hosie KB, Thomas S, Lewis SJ. Gum chewing reduces postoperative ileus. A systematic review and meta-analysis? *Int J Surg.* 2009;7:100-5.
6. 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.* 2014 Jun;121:787-92.
7. Terzioğlu F, Şimsek S, Karaca K, Sariince N, Altunsoy P, Salman MC. Multimodal interventions (chewing gum, early oral hydration and early mobilisation) on the intestinal motility following abdominal gynaecologic surgery. *J Clin Nurs.* 2013;22:1917-25.
8. Jakkaew B, Charoenkwan K. Effects of gum chewing on recovery of bowel function following caesarean section: a randomized controlled trial. *Arch Gynecol Obstet.* 2013;288:255-60.
9. Ertas IE, Gungorduk K, Ozdemir A, solmaz U, Dogan A, Yildirim Y. Influence of gum chewing on postoperative bowel activity after complete staging surgery for gynaecological malignancies: a randomized controlled trial. *Gynecol oncol.* 2013; 131:118-22.
10. Betrán AP, Merialdi M, Lauer JA, Bing-Shun W, Thomas J, Van Look P et al: Rates of cesarean section: analysis of global, regional and national estimates. *Paediatr Perinat Epidemiol.* 2007 Mar; 21(2): 98-113
11. Tita AT, Landon MB, Spong CY, Lai Y, Leveno KJ, Varner MW et al. Timing of elective repeat cesarean delivery at term and neonatal outcomes. *N Engl J Med* 2009 Jan 8;360(2):111-20
12. Townsend CM, Beauchamp RD, Evers BM, Mattox KL. *Textbook of Surgery. The Biological Basis of Modern Surgical Practice*, 17th edn. Philadelphia: Elsevier Saunders, 2004
13. Brunicaudi FC (editor). *Schwartz's Principles of Surgery*, 8th edn. New York: McGraw Hill, 2005.
14. Miedema BW, Johnson JO. Methods for decreasing postoperative gut dysmotility. *Lancet Oncol* 2003;4:365.
15. Fitzgerald JE, Ahmed I. Systematic review and meta-analysis of chewing gum therapy in the reduction of postoperative paralytic ileus following gastrointestinal surgery. *World J Surg* 2009;33:2557-66
16. Whitehead WE, Bradley CS, Brown MB, Brubaker L, Gutman RE, Varner RE, et al. Gastrointestinal complications following abdominal sacrocolpopexy for advanced pelvic organ prolapse. *Am J Obstet Gynecol* 2007;197:78.
17. Kornblith AB, Huang HQ, Walker JL, Spirtos NM, Rotmensch J, Cella D. Quality of life of patients with endometrial cancer undergoing laparoscopic international federation of gynecology and

- obstetrics staging compared with laparotomy: a Gynecologic Oncology Group Study. *J Clin Oncol* 2009;27:5337–42.
18. Guyton A, Hall J. *Textbook of Medical Physiology*, 10th edn. Philadelphia, PA: Saunders; 2000.
19. Noble EJ, Harris R, Hosie KB, Thomas S, Lewis SJ. Gum chewing reduces postoperative ileus? A systematic review and meta-analysis. *Int J Surg* 2009;7:100–5
20. Marderstein EL, Delaney CP. Management of postoperative ileus: focus on alvimopan. *Ther. Clin. Risk Manag.* 2008; 4: 965–73.
21. Kafali H, Duvar CI, Gozdemir E, Simavli S, Onaran Y, Keskin E. Influence of gum chewing on postoperative bowel activity after cesarean section. *Gynecol. Obstet. Invest.* 2010; 69: 84–7.
22. Ngowe MN, Eyenga VC, Kengne BH, Bahebeck J, Sosso AM. Chewing gum reduces postoperative ileus after open appendectomy. *Acta Chir. Belg.* 2010; 110: 195–9.
23. Smith SR, Lim P, Draganic B. Effect of gum chewing on gastrointestinal recovery after laparoscopic colorectal resectional surgery: a prospective randomized clinical trial. *ANZ J. Surg.* 2010; 80 (Suppl.): A17.
24. Hirayama I, Suzuki M, Ide M, Asao T, Kuwano H. Gum-chewing stimulates bowel motility after surgery for colorectal cancer. *Hepatogastroenterology.* 2006;53(68):206–8
25. 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. *Obstet Gynecol.* 2002;100(2):230–4.
26. Dehcheshmeh DF, Salehian T, Gangi F, Beigi M. The effect of chewing sugar free gum after elective cesarean-delivery on return of bowel function in primiparous women. *QJRM.* 2011;4(4):16–20.
27. Schuster R, Grewal N, Greaney GC, Waxman K. Gum chewing reduces ileus after elective open sigmoid colectomy. *Arch Surg.* 2006;141(2):174–6
28. Quah HM, Samad A, Neathey AJ, Hay DJ, Maw A. Does gum chewing reduce postoperative ileus following open colectomy for left-sided colon and rectal cancer? A prospective randomized controlled trial. *Colorectal Dis.* 2006;8(1):64–70.