

Use of Abdominal Binders for Postoperative Pain After Gastrointestinal Surgery: An Integrative Review

Kelsey Carter Stoker, BSN, RN

Purpose: *No national policies or clinical practice guidelines have been identified regarding best practices in addressing postoperative pain after abdominal surgery with adjunctive nonpharmacologic therapies, such as abdominal binders.*

Design: *Integrative review.*

Methods: *An integrative review was conducted using Cochrane, PubMed, Medline, and Cumulative Index to Nursing and Allied Health Literature databases, collecting articles published within the last 5 years regarding abdominal binder use after adult gastrointestinal surgeries.*

Findings: *Five articles met inclusion criteria. Two articles provided statistically significant results regarding reduction in pain, whereas the other three suggested likely postoperative pain reduction, subjective improved pain, and comfort among other benefits.*

Conclusions: *The use of abdominal binders postoperatively does not increase risk or harm to the patient. Researchers suggest that this intervention may not only offer analgesic benefits but also may increase patient satisfaction and decrease psychological distress. However, because of the limited evidence, additional high-level randomized controlled trials regarding abdominal binder use to address postoperative pain are needed.*

Keywords: *abdominal binder, postoperative pain, gastrointestinal, surgery.*

© 2018 by American Society of PeriAnesthesia Nurses

MORE THAN 100 MILLION SURGICAL and nonsurgical procedures occur in the United States each year, and approximately 18.5% of all surgeries in the United States are abdominal procedures, making abdominal surgery the second most prevalent surgery type.¹⁻³ Postoperative pain is the leading patient complaint after surgery, and

abdominal surgeries result in a high prevalence of pain and poor pain management worldwide.^{2,3} Postoperative pain is often treated through a multimodal approach for optimal pain control after abdominal surgeries with opioids as a conventional treatment option.¹ Yet, the cost of opioids and patient-controlled analgesia alone in the first 48 hours after abdominal surgeries is higher than the cost for pharmacologic pain control for total knee replacements and hysterectomy.⁴ Thus, in an attempt to develop alternative modalities and lower costs, numerous studies have explored or evaluated different medications and modalities for pain control, including preemptive analgesia, education, and surgical techniques. These studies concluded that adequate pain control results from a multimodal

Kelsey Carter Stoker, BSN, RN, Medical University of South Carolina, Charleston, SC.

Conflict of interest: None to report.

Address correspondence to Kelsey Carter Stoker, BSN, RN, Medical University of South Carolina, College of Nursing, 99 Jonathan Lucas St, MSC 160, Charleston, SC 29425; e-mail address: stokerk@musc.edu.

© 2018 by American Society of PeriAnesthesia Nurses

1089-9472/\$36.00

<https://doi.org/10.1016/j.jopan.2018.10.010>

approach with the risks and benefits weighed for each patient.⁵

This multimodal approach, a combination of pharmacologic and nonpharmacologic interventions, is needed in the preoperative, intraoperative, and postoperative phases.^{1,5} A specific pharmacologic cocktail has not been shown to work with every patient because of risks or patient-specific needs. The use of nonpharmacologic interventions is less common, and the need for additional research is supported by the literature.¹ However, research does indicate that the nonpharmacologic intervention of an abdominal binder poses no risk or harm for short-term postoperative use and may reduce pain postoperatively.⁶⁻¹⁰ The purpose of this review is to explore the efficacy of using abdominal binders after gastrointestinal surgeries to control pain and increase patient satisfaction.

Problem and Significance

Abdominal surgeries are the second highest surgical type in the United States, and pain control after these surgeries continues to pose a national problem in the United States and a considerable health concern worldwide.² Inadequate acute pain control leads to decreased mobility, delayed recovery, prolonged hospitalization, increased risk for embolism complications (pulmonary and thromboembolism), and increased hospital costs.¹¹ Hingula et al² correlated inadequate postoperative pain control to chronic problems, finding that uncontrolled pain increased the risk of “development of long-term psychological distress and chronic postsurgical pain.”^{13,17} Because of the pain and distress it causes, inadequate pain control negatively impacts patient experiences and leads to a decrease in patient satisfaction scores.¹² Improving postoperative pain will increase patient satisfaction, improve outcomes, and help prevent chronic complications.^{1,5}

Methods

A literature search was completed using Cochrane, PubMed, Medline, and Cumulative Index to Nursing and Allied Health Literature databases. The initial search of these databases regarding abdominal binders yielded 274 articles. Keywords relevant for the inclusion criteria included *postoperative pain*, *abdominal surgery*, *adult*, and

abdominal binder. With the additional inclusion criteria and only publications published within the last 5 years, this limited the number of articles to 17. Duplicate articles were excluded, as were articles on surgeries that consisted of obstetrics, gynecologic, or dermatologic procedures, limiting the search to only gastrointestinal surgeries. On the basis of a review of titles and abstracts, five articles were selected to undergo a full-text review.

Review of the Literature

Five recent studies evaluated the effectiveness of the adjunctive nonpharmacologic use of abdominal binders to manage pain after gastrointestinal surgeries. Rothman et al⁶ conducted a systematic review (1966 to July 2013) to evaluate abdominal binder use after major abdominal surgeries for postoperative pain management. Eight studies were included (N = 578) in the review. Rothman et al reported that the literature regarding pain control was sparse; however, they did find weak evidence to support the use of abdominal binders to decrease postoperative pain. Each of the articles regarding pain highlighted an improvement in pain and trends toward the analgesic effect with the addition of the binder. Physical function and psychological distress improved with the use of abdominal binders, but the researchers concluded that additional research was warranted for this intervention in regards to pain management.⁶

Bouvier et al⁷ conducted a systematic review and a provider questionnaire regarding abdominal binder use status after laparotomy. They reviewed the four trials that had been published, all of which had small sample sizes. The four articles spanned 30 years and had conflicting results; however, there was some consensus on postoperative use of abdominal binders improving comfort. Because of the small number of articles and conflicting results, the researchers suggested that a multicenter randomized control trial (RCT) should be completed to evaluate the quality of life when abdominal binders are used after surgery.⁷

Arici et al⁸ conducted an RCT to assess whether an elastic abdominal binder after major abdominal surgery could improve postoperative pain during movement. In this study, 84 participants were divided into two groups—a control group (n = 42) and an intervention group (n = 42). Excluded

participants included those with body mass index 35 or greater, abdominal surgery in the last year, chronic obstructive pulmonary disease, stage IV cancer, use of walking aids, American Society of Anesthesiologists (ASA) score of IV or greater, and medium or higher pain level before the surgery. The visual analog scale (VAS) was used to score pain. Scoring results indicated that pain was significantly decreased for the groups using the abdominal binder after movement or exercise ($P < .001$) on postoperative day 1, 4, and 7, which were the selected intervals by the researchers. Data between these days were not reported, but there was decline from day 1 to 7 and a statistical decline from day 1 to 4 and 7 regarding total pain and VAS scores. Analgesics were also stopped on postoperative day 4 for both groups. Arici et al also concluded that the addition of an abdominal binder reduced patients' pain postoperatively with movement after major abdominal surgeries without harm or side effects, but the researchers recommended that larger multicenter studies be conducted for further investigation of these findings.⁸

Clay et al⁹ conducted an RCT on the use of elastic abdominal binders to reduce postoperative pain after midline laparotomy surgeries and evaluated lung function and intra-abdominal pressure. The study included 48 participants; the intervention group included 23 participants who wore the binder and the control group included 25 who did not wear binder. Dementia and chronic oxygen use patients were excluded. Pain scores were collected using the VAS and ventral hernia pain questionnaire daily with education given to the nurses regarding the pain scales prior. Clay et al reported a significant reduction in pain on day 5 with the use of a girdle and an overall decrease in morphine equivalence in milligrams in the binder group compared with no binder group with day 5 being significant ($P < .02$) but no other significant difference was noted between the groups. However, pain scores for the girdle group were less each day compared with the control group. They also concluded no change in wound healing or patient satisfaction was noted between the two groups.⁹

In another RCT, Christoffersen et al¹⁰ investigated the use of elastic abdominal binders worn continuously, night and day, for 1 week postoperatively (intervention group $n = 28$) compared with no abdominal binder (control group $n = 28$). VAS

scores and subjective comfort and satisfaction scores were collected and analyzed. Christoffersen et al found that 86% (24/28) of patients in the intervention group reported a subjective pain benefit from wearing binders, which contributes to the patient experience, but no significant reduction in pain scores was noted. Patients with chronic pain syndrome, or drug or alcohol abuse, those with decompensated liver cirrhosis, or those speaking a foreign language were excluded because of possible poor compliance.¹⁰ All researchers recommended larger multicenter studies for additional research because of small sample sizes but reported limited to no risk or harm because of the applied intervention.

Discussion

The use of abdominal binders is evaluated throughout the research as adjunctive pain management therapy after surgeries, and was reported as well tolerated with little discomfort to the patient. An abdominal binder, a nonpharmacologic adjunctive intervention, contributed to a significant reduction in postoperative pain with movement and at rest with overall patient satisfaction in the most recent study; however, Arici et al⁸ had a small sample size, and no blinding was available because of the observable presence of the intervention. Clay et al⁹ also highlighted a statistical improvement in pain but also had the same limitations. However, there is no evidence suggesting this intervention should be seen as a sole approach to pain management as each study had adjunctive pharmacologic therapy.

Throughout the trials and use of abdominal binders for research purposes, there is a wide variety of the additional adjunctive pharmacologic therapy in each study. This limits the comparison among the studies but allows for adequate comparison in each study, as these treatments were consistent among the control and intervention groups. All studies highlighted an improvement with postoperative pain without harm or risk to the patient in the acute phase. Furthermore, Clay et al⁹ reported a decrease in opiate use on day 5 but this was not an outcome researched in many of the studies. With the opiate epidemic in the United States, this could possibly assist in a reduction of use and therefore warrants further research. However, each study also was limited because of small

sample sizes in each study or systematic review, making it more difficult to make a guideline change for this intervention. Long-term use was not evaluated as this therapy is for the acute postoperative phase.

Rothman et al⁶ showed improved psychological distress with the use of an abdominal binder as an adjunct to the pain improvement. Moreover, even in research that did not statistically show a decrease in postoperative pain, the researchers did highlight a subjective pain improvement or improved comfort and patient experience.^{7,10} These additional benefits can assist with an improvement in pain management, improve patient outcomes, and help prevent chronic pain.^{1,2}

The researchers in many of the trials or reviews also evaluated other possible benefits or risks associated with the use of the abdominal binders. Pulmonary function was evaluated in all five articles; the researchers concluded that the use of an abdominal binder does not statistically decrease the pulmonary function with some discussion on possible improvement with the use of an abdominal binder. Physical function was evaluated in two of the articles,^{6,8} and it was concluded that physical movement and function improved with the use of the abdominal binder. Seroma formation was shown to have no improvement or increase with the use of the binder.^{6,7,10} Gastrointestinal function including postoperative nausea and vomiting was statistically unchanged with the use of the binder as well.^{8,10} Therefore, negative outcomes after gastrointestinal surgeries unrelated to pain were unchanged or improved with the addition of an abdominal binder.

Conclusions

There is no national policy or universal Clinical Practice Guideline addressing postoperative pain

with abdominal surgeries especially with adjunctive nonpharmacologic additions such as abdominal binders. The use of abdominal binders after abdominal surgeries is not currently a regular practice in the United States, but binders are routinely used in Europe as a standard practice. Evidence indicates that the binders may improve pain control, which in turn is shown to decrease surgical complications, decrease hospital length of stay, and increase patient satisfaction.¹³ A limited number of studies have investigated this topic, and the studies reviewed in this article were limited by small participant sample size. Yet, the use of abdominal binders postoperatively does not cause any additional harm or risk to the patient and even without significant evidence of their analgesic benefit, binders may increase patient satisfaction. Providers may therefore choose to use abdominal binders without risk, harm, or increase in pain to selected groups of patients. However, future research needs to focus on the selected groups of patients because exclusion criteria are not consistent among the studies including abdominal circumference or body mass index. Type and attachment apparatus of the elastic binder and length of time should be focus of future research because use length spans 3 to 7 days postoperatively. Longer use could pose a threat to wound healing, which was reported to be unchanged with the use of the binder in 5 days.⁹ Before making clinical guideline practice changes, future high-level studies should be conducted to evaluate pain control and patient satisfaction with the implementation of an abdominal binder status after gastrointestinal surgery.

Acknowledgments

I would like to thank Dr Cathy Durham, Dr Kathy Van Ravenstein, and the Center for Academic Excellence of the Medical University of South Carolina for their expertise and assistance with editing.

References

1. Gordon D, de Leon-Casasola O, Wu C, Sluka K, Brennan T, Chou R. Research gaps in practice guidelines for acute postoperative pain management in adults: Findings from a review of the evidence for an American pain society clinical practice guideline. *J Pain*. 2016;17:158-166.
2. Hingula L, Maslin B, Vadivelu N, et al. Perioperative pain control in gastrointestinal surgery. *Middle East J Anesthesiol*. 2015;23:137-146.
3. Weiss AJ, Elixhauser A. *Trends in operating room procedures in U.S. hospitals, 2001-2011. HCUP Statistical Brief #171*. Rockville, MD: Agency for Healthcare Research and Quality;

2014. Available at: <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb171-Operating-Room-Procedure-Trends.pdf>. Accessed January 1, 2019.

4. Palmer P, Ji X, Stephens J. Cost of opioid intravenous patient-controlled analgesia: Results from a hospital database analysis and literature assessment. *Clinicoecon Outcomes Res*. 2014;6:311-318.

5. Chou R, Gordon D, Thirlby R, et al. Management of postoperative pain: A clinical practice guideline from the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' committee on regional anesthesia, executive committee, and administrative council. *J Pain*. 2016;17:131-157.

6. Rothman J, Gunnarsson U, Bisgaard T. Abdominal binders may reduce pain and improve physical function after major abdominal surgery—A systematic review. *Dan Med J*. 2014;61:A4941.

7. Bouvier A, Rat P, Ortega-Deballon P, et al. Abdominal binders after laparotomy: Review of literature and French survey of policies. *Hernia*. 2014;18:501-506.

8. Arici E, Tastan S, Can M. The effect of using an abdominal binder on postoperative gastrointestinal function, mobilization,

pulmonary function, and pain in patients undergoing major abdominal surgery: A randomized controlled trial. *Int J Nurs Stud*. 2016;62:108-117.

9. Clay L, Gunnarsson U, Franklin K, Strigård K. Effect of an elastic girdle on lung function, intra-abdominal pressure, and pain after midline laparotomy: A randomized controlled trial. *Int J Colorectal Dis*. 2014;29:715-721.

10. Christoffersen M, Olsen B, Rosenberg J, Bisgaard T. Randomized clinical trial on the postoperative use of an abdominal binder after laparoscopic umbilical and epigastric hernia repair. *Hernia*. 2015;19:147-153.

11. Yang X, Peng N, Li N, Li J. Effect of cyclooxygenase-2-specific inhibitors on postoperative analgesia after major open abdominal surgery. *Pain Manag Nurs*. 2015;16:242-248.

12. Subramanian P, Ramasamy S, Ng K, Chinna K, Rosli R. Pain experience and satisfaction with postoperative pain control among surgical patients. *Int J Nurs Pract*. 2016;22:232-238.

13. Guay J, Nishimori M, Kopp S. Epidural local anaesthetics versus opioid-based analgesic regimens for postoperative gastrointestinal paralysis, vomiting and pain after abdominal surgery. *Cochrane Database Syst Rev*. 2016;7:CD001893.