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Review Article

Evidence summary for nonsurgical prevention and management of parastomal hernia in patients with enterostomy

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Abstract: Objective: To select and obtain the best evidence for parastomal hernia (PH) prevention in patients with enterostomy so as to provide reference for clinical practice to decrease the rate of PH. Methods: Based on the method of evidence-based nursing, this paper proposes the prevention and management of PH in patients with enterostomy. The literature was checked according to the "6S" model, and literature evaluation standards (2016 edition) of JBI Evidence-based Health Care Center in Australia were adopted to evaluate the literature quality and evidence level of various studies. Results: Combined with the judgment of professionals, 24 pieces of relevant evidence from 7 dimensions were summarized, including related controllable risk factors, diagnosis and identification, nutrition, the strength of abdominal wall muscle around the stoma, reduction of abdominal pressure, the use of belt on treatment of PH, and the prevention of complications related to PH. Conclusions: This study summarized the best evidence of nonsurgical prevention and management of PH in patients with enterostomy, and provided an evidence-based basis for nurses to carry out clinical work, so as to use scientific methods to manage and prevent the occurrence of PH in patients with enterostomy and improve the quality of care.

Keywords: Enterostomy, parastomal hernia (PH), evidence-based nursing, prevention, management

Introduction

PH is one of the most common complications after permanent enterostomy. It refers to the protrusion of skin around the stoma, indicating that one or more intestinal rings pass through the fascia defect around the stoma and enter the subcutaneous tissue [1]. The incidence rate of one year after operation is 33-44%. If effective prevention and management are not carried out, a higher incidence rate will occur with the extension of postoperative time [2], which reaches 50% after 7 years [3]. Once PH occurs, the abdomen of the patient is often accompanied with a feeling of falling and swelling; the PH block will also affect the wearing of the stoma pocket, the patient's dressing and the appearance, making the patient feel pressure and affecting their quality of life [4].

At present, the treatment of PH includes surgical treatment and non-surgical treatment. In terms of surgery, preventive patch implantation and surgical repair are mainly used. However, preventive patch implantation is not widely used in clinical practice, and the recurrence rate after surgical repair is still 10%-28% [5]. Therefore, asymptomatic patients prefer conservative treatment [6]. However, the current non-surgical intervention is not systematic and quantitative, mainly focusing on preoperative positioning and single propaganda and education [7, 8]. Due to the complexity of patient etiology and the diversity of intervention measures, the practicability and repeatability are not great. Therefore, it is very important to prevent PH and improve the life quality of patients. At present, the guidelines on enterostomy management focus more on the clinical pathway of preoperative and postoperative intervention, health education. However, the prevention and management of PH is less involved, and the content is not detailed enough. This study systematically searched domestic and foreign lit-

erature on the prevention and management of PH in patients with enterostomy; evaluated, synthesized and summarized the evidence; and finally formed the best evidence, which provided reference for the formulation of specific measures in prevention and management of PH in patients with enterostomy.

Materials and methods

Problem establishment

Based on the clinical problems found, we used the problem development tool of Shanghai Fudan University evidence-based nursing center [9] to form PIPOST evidence-based problems. P (target population of evidence application) indicates enterostomy patients; I (intervention method) indicates evaluation, prevention, identification, management of PH; P (Application of evidence professionals) indicates clinical medical personnel; O (outcome) indicates the incidence rate of PH, the awareness of patients and medical staff on the prevention and management of PH, patients' compliance with the preventive measures of PH, etc.; S (evidence application place) indicates gastrointestinal surgery ward, stoma clinic, etc.; and T (evidence type) indicates best practice, evidence summary, guidelines, system evaluation, expert consensus, original research, etc.

Bibliography retrieval

According to the evidence pyramid "6S evidence model" [10], bibliography retrieval was carried out. Retrieval from the following databases: UpToDate, BMJ Best Practice, Joanna Briggs Institute (JBI) database, Registered Nurses' Association of Ontario (RNAO), Guideline International Network (GIN), National Institute for Health and Care Excellence (NICE), National Guideline Clearinghouse (NGC), the Scottish Intercollegiate Guidelines Network (SIGN), Wound, Ostomy and Continence Nurses society (WOCN), Enhanced Recovery After Surgery society (ERAS), YiMaiTong clinical guide network, Cochrane Library, Cumulative Index to Nursing & Allied Health (CINAHL), Excerpta Medical Database (EMBASE), PubMed, Chinese Biomedical Literature Database (CBLD), CNKI, etc. The key words in English were "enterostomy/ostomy/stoma", "parastomal hernia/incision hernia/hernia sac", "prevent/management/nursing/care". The retrieval time is from March 1, 2010 to March 1, 2020.

Inclusion and exclusion criteria

Inclusion criteria: the subjects were patients after enterostomy; studies related to the assessment, prevention and management of PH; outcome indicators included PH and other complications; research types included best practice, summary of evidence, guidelines, systematic evaluation, expert consensus and original research closely related to the topic; the research language was Chinese or English. Exclusion criteria: studies that can't obtain the full text; literature types are case reports, literature reviews, research plans or plans; and studies that fail to pass the literature quality evaluation.

Evaluation criteria

We selected the corresponding evaluation tools to evaluate the quality according to the literature type. The quality evaluation of best practice and evidence summary traces back to the original literature. The quality evaluation criteria of the guidelines were using Appraisal of Guidelines for Research and Evaluation, AGREE II (agree II) updated in the United Kingdom in 2017 [11]. Randomized controlled studies, quasi-experimental studies, cohort studies, case-control studies, descriptive studies, expert consensus and expert opinions were evaluated according to the corresponding evaluation criteria of JBI evidence-based health care center in Australia (2016).

Literature quality evaluation

The quality evaluation of included literature was completed by two personnel with an evidence-based medicine background and guidelines by three personnel using the Newcastle-Ottawa Scale (NOS). When there was conflict between the included literature and evaluation opinions, the nursing evidence-based team made the final judgment. The inclusion principle follows the priority of evidence-based evidence, high-quality evidence and newly published authoritative literature [12].

Results

General information of included literature

A total of 553 published literature was obtained through preliminary retrieval and 10 items of literature were finally included after screening, including 5 guidelines [13-17], 3 expert consen-

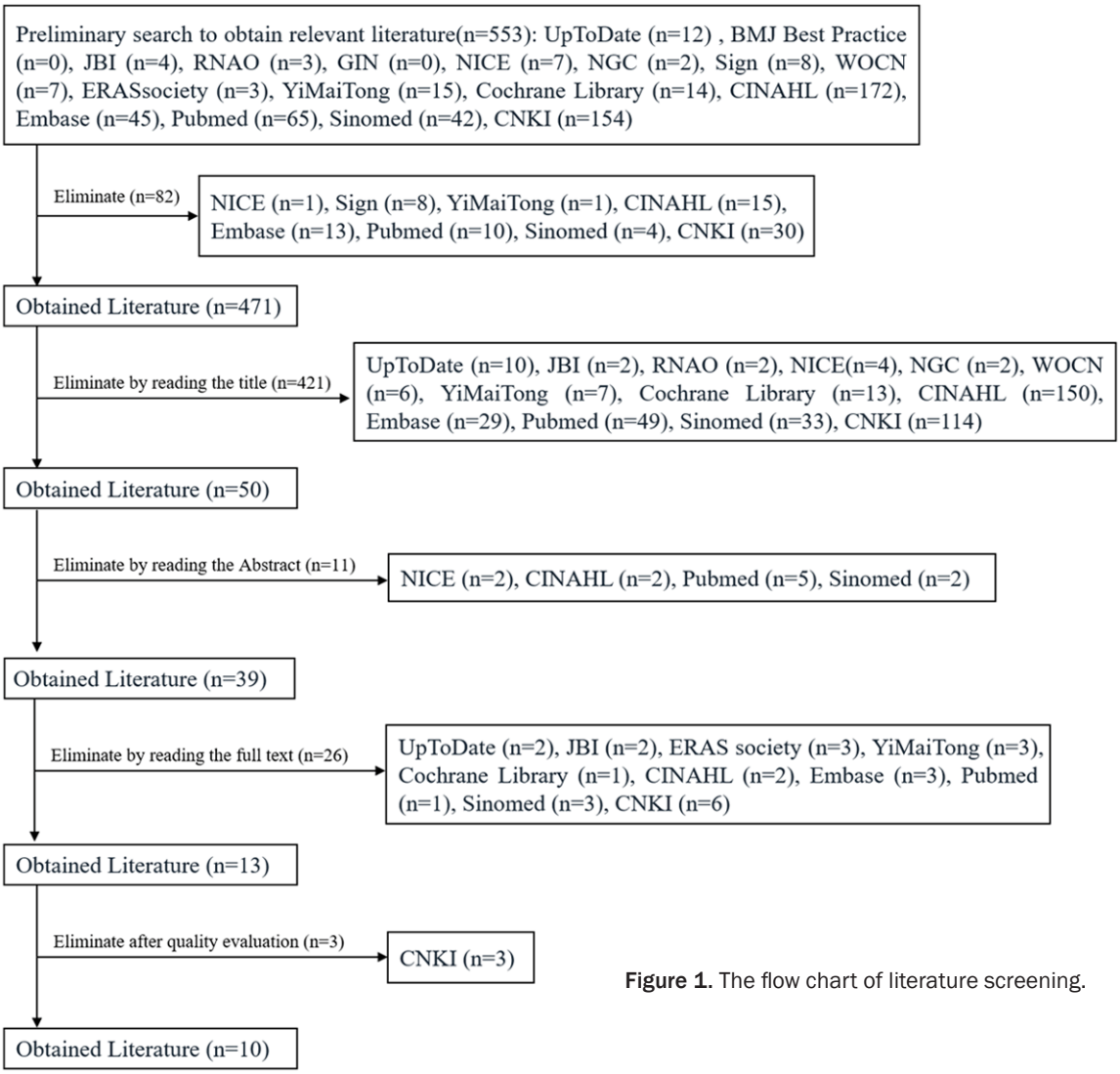

Figure 1. The flow chart of literature screening.

sus/expert opinions [18-20], 1 case-control study [21], and 1 quasi-experimental study [22] (**Figure 1** and **Table 1**).

Quality evaluation results of included literature

A total of 5 guidelines were included in this study, including 1 guideline from RNAO [13], 2 guidelines from the medical YiMaiTong clinical guideline work [14, 17], 1 guideline from WOCN [15], and 1 guideline from the European hernia society (EHS) [16], which were completed by three reviewers independently. The results are shown in **Table 2**. One expert consensus [18] evaluated in this study was from the Colorectal society of Great Britain and Ireland, and two other expert opinions [19, 20] were from the CINAHL database. The results of all entries were "yes". One case-control study [18] in this study was from the CINAHL database. Except for "whether the exposure time is long enough" in Article 9, it was all "yes". In this study, one quasi-experiment was included, which was from PubMed database. Except for the evaluation results in Item 4, all other items were all "yes".

Description and summary of evidence

The standard for grading evidence was the evidence recommendation level system of JBI Evidence-based Health Care Center in Australia (2014 edition). The evidence level was divided into 1-5 levels, and the evidence was divided into A and B levels according to its reliability and rigor [24].

Table 1. General information of included literatures

Database source	Included Literature	Research topics	Research object	Nature of evidence	Publication time (year)
RNAO	Nafsin et al. [13]	Nursing measures and prevention of complications after enterostomy	Adult patients who are going to have or have undergone enterostomy	Guideline	2019
YiMaiTong	Johnston et al. [14]	Nursing measures before and after enterostomy	Patients with enterostomy	Guideline	2016
WOCN	Margaret et al. [15]	Perioperative nursing of enterostomy or urostomy	Patients with planned or completed urinary and enterostomy	Guideline	2018
EHS	Antoniou et al. [16]	Diagnosis, classification and prevention of PH	Patients with PH	Guideline	2017
YiMaiTong	Ferrara et al. [17]	Management of adult colostomy	Adult patients who plan to do and have undergone urinary and enterostomy, and patients who plan to do reinnervation	Guideline	2019
CINAHL	Timothy et al. [21]	Risk factors of PH	Patients with open urinary tract stoma	Case-control study	2014
Pubmed	North et al. [22]	Weight bearing, abdominal support belt and abdominal exercise program recommendations reduced the incidence of PH	Adult colostomy patients except palliative treatment and inability to walk	Quasi experiment	2014
ACPGBI	Neil et al. [18]	Prevention and treatment of PH	Patients with enterostomy	Expert consensus	2018
CINAHL	North et al. [19]	Risk factors and prevention strategies of PH	Patients with enterostomy	Expert opinion	2017
CINAHL	Readding [20]	Selection and use of abdominal belt near PH	patients with enterostomy or after stoma retraction	Expert opinion	2014

Table 2. The methodological quality evaluation results of the guidelines included in this study

Included literature	Percentage of standardization (%)						≥60% Number of fields	≥30% Number of fields	Recommendation level
	Scope and purpose	People involved	Strictness of guidelines development	Clarity of guidance presentation	Applicability of the guidelines	The independence of compiling guidelines			
Nafsin et al. [13]	94.44	68.52	57.64	87.04	81.94	94.44	5	6	A
Johnston et al. [14]	94.44	94.44	57.64	79.63	41.67	30.55	3	6	B
Margaret et al. [15]	87.04	64.82	79.86	83.33	56.94	44.44	4	6	B
Antoniou et al. [16]	88.89	59.26	59.72	88.89	83.33	94.44	4	6	B
Ferrara et al. [17]	87.04	77.78	72.92	79.63	58.33	83.33	5	6	A

Summary of best evidence

Through the summary of the evidence, 24 best pieces of evidence were formed from six aspects: relevant controllable risk factors, diagnosis and classification, preoperative prevention, postoperative prevention, intervention strategy, and the use of an abdominal belt, which were shown in **Table 3**.

Related controllable risk factors: The evidence 1, 2, 3, and 4 listed the controllable risk factors of PH. It can effectively control the occurrence of PH by evaluating and regulating the position of the stoma, nutritional status, chronic diseases and some symptoms of increasing abdominal pressure before and after the operation. Osborne et al. [23] have developed a risk assessment tool for PH, which can be used for preoperative assessment to identify high-risk groups for more targeted prevention. The assessment tool has been tested on a small scale in 78 patients and is being promoted nationwide (UK).

Diagnosis and identification: Evidence 5, 6, 7 and 8 described the diagnosis and classification of PH and the identification of its symptoms. At present, there is no gold standard for the detection of PH. In the clinical manual examination, the retrospective accuracy of PH was 63-96%, which showed that some patients with PH were still undetected [26-28], showing that this method was not completely accurate. At the same time, some reports [29] showed that even with CT examination, 7% of patients with PH were not found. It can be seen that the two methods are both inadequate. Three-dimensional ultrasonography is a new method for the diagnosis of PH [30], but more studies are needed to confirm its reliability. Therefore, the combination of clinical manual diagnosis and imaging diagnosis is still recommended to diagnose PH.

In terms of classification of PH, five classification methods [30-34] have been published, including those proposed by European hernia society. However, the application of these classification methods is very limited and has not been confirmed so far. The classification method of PH published by EHS in 2014 [35] provided a clear definition for different types of PH, and clarified the existence of primary or recurrent PH, which can become a low-cost and high reliability evaluation method.

Nutrition: Evidence 9, 10 and 11 suggest that both overnutrition and malnutrition should be avoided. Bland and Young [25] pointed out that the optimal BMI between 20 and 25 kg/m^2 may reduce the occurrence of PH, which means that weight management of patients with stoma can reduce the occurrence of PH to a certain extent. Like other large-scale surgical operations, preoperative optimization of variables, such as anemia [36] and body mass index (BMI) [38], has the best surgical effect, so these variables have a significant impact on the surgical results after colorectal surgery [22].

The strength of abdominal wall muscle around the stoma: Evidence 12, 13, 14 and 15 suggest the importance of enhancing the muscle strength of the abdominal wall around the stoma. Incomplete preoperative bowel preparation will increase the risk of infection at the stoma site, resulting in poor wound healing or rupture of suture to form PH [6]. Therefore, the Centers for Disease Control and Prevention (CDC) recommends that compound polyethylene glycol catharsis was used for bowel preparation in non-obstructive patients 12 hours before surgery [39]. The evidence about preoperative positioning of stoma to prevent PH is limited to one study [25]. The results of this study showed that the incidence of PH in the group with preoperative stoma positioning was 3.8%, while that in the group without preoperative stoma localization was 24.5%. We concluded that preoperative abdominis positioning in rectus can reduce the incidence of PH in patients with enterostomy. At present, the clinical education does not specify the methods of abdominal muscle exercise. For patients, the intensity and frequency of core muscle exercise is also a problem. The specific core muscle exercise method was in a class of quasi-experimental reported by Thompson, which can be used as a reference [2].

Reduction of abdominal pressure: Evidence 16, 17, and 18 suggest precautions for reducing abdominal pressure, including weight limits for lifting weights, and control of symptoms that cause increased abdominal pressure.

The use of belt on treatment of PH: Evidence 19, 20, 21 and 22 describe the choice, timing and method of use of an abdominal belt near the PH respectively. In clinical work, patients are rarely given professional guidance on the use of abdominal belts, and patients are often

Table 3. The best evidence of non-surgical prevention and management of PH in patients after enterostomy

Project	Content of evidence	Source	Types	Level of evidence	Recommendation level
Relevant controllable risk factors	1. Nutrition: obesity is an independent risk factor for the occurrence of PH. BMI >30 kg/m^2 is associated with a higher incidence of complications, leading to a long-term high tension of abdominal wall muscles and weak abdominal wall strength; malnutrition caused by iron, zinc and selenium deficiency is also a risk factor of PH.	EHS	Based on guidelines	Level 3d	A
	2. The position of stoma is not in rectus abdominis.	EHS	Based on guidelines	Level 3d	A
	3. Diabetes mellitus causes PH by affecting the healing of wound and stoma; the probability of parastomal hernia in smokers is 4 times higher than that in non-smokers.	CINAHL	Based on expert opinion	Level 3c	B
	4. Some of the symptoms leading to increased intra-abdominal pressure, such as sneezing, acute and chronic cough, vomiting, etc.	CINAHL	Based on expert opinion	Level 2a	A
Diagnosis and identification	5. The diagnosis of PH requires the use of Valsalva technique for clinical examination in supine or upright position, but CT scan or ultrasound may be required in uncertain cases.	EHS	Based on guidelines	Level 3c	B
	6. It is suggested that the 2014 European Association classification standard should be used in the research report Uniformly.	EHS	Based on guidelines	Level 5	B
	7. Patients must be taught to recognize signs of PH such as swelling, pain and discomfort.	YiMaiTong	Based on guidelines	Level 2c	A
	8. Instruct patients with PH to report to the medical staff immediately once they find the following symptoms: deep colostomy or persistent pain; no gas, feces or urine in the stoma; or abdominal distension, nausea, vomiting, loss of appetite, etc.	WOCN	Based on guidelines	Level 2c	A
Nutrition	9. Anemia should be corrected before operation (intravenous iron supplement is more effective).	YiMaiTong	Based on expert consensus	Level 1a	A
	10. Obesity patients should be advised to lose weight before operation, and the goal is to have a BMI value of at least <35 kg/m^2.	YiMaiTong	Based on expert consensus	Level 3c	A
	11. According to the suggestion of postoperative weight management expert to make the best BMI between 20-25 kg/m^2, in order to reduce the occurrence of PH.	RNAO	Based on guidelines	Level 3d	B
	12. Before operation, patients should be advised to take proper exercise, and cardiopulmonary exercise test (CPET) was used to evaluate cardiopulmonary function and surgical risk stratification.	YiMaiTong	Based on expert consensus	Level 3d	A
Avoid weakness of abdominal wall muscles around stoma	13. In order to reduce the incidence of infection at the stoma site and prevent the formation of PH caused by suture rupture resulting from infection, compound polyethylene glycol was used in non-obstructive patients 12 hours before operation.	CINAHL	Based on expert opinion	Level 3c	A
	14. The site of stoma was marked before operation and located in rectus abdominis.	YiMaiTong	Based on guidelines	Level 2c	B
	15. It is suggested that patients should start abdominal muscle exercise within 3 months and last for at least 1 year.	RNAO	Based on guidelines	Level 2c	B
Reduce abdominal pressure	16. It is suggested that smoking patients quit smoking for 4-8 weeks before operation.	YiMaiTong	Based on expert consensus	Level 2a	A
	17. In lifting weight: avoid carrying 10 pounds (about 4.5 kg) and lifting after operation.	RNAO	Based on guidelines	Level 2d	B
	18. Educate patients to find and treat cough, nausea, vomiting, constipation, prostatic hyperplasia and other symptoms in time.	RNAO	Based on guidelines	Level 2d	A

Use of abdominal belt	19. Intervention in the occurrence of PH: the use of abdominal belt.	CINAHL	Based on expert opinion	Level 2c	A
	20. Selection of abdominal belt: nursing specialist nurse or abdominal belt manufacturer should assist patients to select abdominal belt after measuring the patient's waist and abdomen size; the length should cover the stoma and pouch; in case of obstruction or thin stool, the perforated abdominal belt should be used; in terms of style, pants style is more recommended than simple abdominal belt.	CINAHL	Based on expert opinion	Level 5	A
	21. The timing of using abdominal belt: it is suggested that the patients should start wearing abdominal belt within 3 months after operation, and provide relevant information; in the first year of operation and when doing some activities that cause abdominal pressure to increase, abdominal belt should be used to reduce dragging feeling and play a supporting role; patients after stoma retraction also need preventive use of abdominal belt.	CINAHL	Based on expert opinion	Level 5	A
	22. How to use the belt: do not directly contact with the skin, so as to avoid skin problems caused by skin compression; wear the abdominal belt before getting up in the morning; if wearing it later in the day, it is recommended that the patient lie down for 5-20 minutes before wearing, so as to let the hernia return to the abdominal cavity.	CINAHL	Based on expert opinion	Level 5	A
Prevention of complications related to PH	23. If the water and stool are not easy to reflux, stop the colostomy irrigation.	WOCN	Based on guidelines	Level 5	A
	24. Patients with PH should use soft pouch to prevent skin damage.	WOCN	Based on guidelines	Level 5	A

at a loss what to do when facing a variety of abdominal belts [19], which is also a weak point in health education for PH in China. The choice and use of abdominal belts can help patients to prevent and deal with PH more effectively.

The prevention of complications related to PH: Evidence 23 and 24 indicate that once PH is formed, it is necessary to prevent its deterioration and other complications. Many patients with colostomy accept colostomy irrigation to improve their quality of life, which have a high incidence of PH [16]. Once the PH has occured, colostomy irrigation can be stopped to prevent the aggravation of PH and intestinal obstruction. The soft pouch is more suitable for the skin of patients with PH, thus reducing leakage and skin problems.

Discussion

The scientificity of evidence summary on prevention and management of PH

Literature quality evaluation ensures the scientificity of evidence and is also the key step of evidence-based nursing [24]. The guidelines included in this study were evaluated by three personnel who had received systematic an evidence-based medicine course training using the internationally recognized AGREE II, so as to ensure the scientific effectiveness of the included guidelines. In addition, this study included high-quality original research, which not only ensured the reliability of evidence, but also deeply understood the clinical situation in the application of evidence. Through the summary of the included literature evidence, the content of evidence will be specific, quantitative, in line with the needs of clinical practice, which is conducive to the meticulous clinical work of medical staff. Therefore, the evidence summarized in this study is scientific and practical.

The significance of evidence summary on prevention and management of PH

Studies have shown that [25], prevention of PH is more important than treatment, from the perspective of nurses. However, the clinical nursing of PH in our country mostly stay within health education after discharge and the outpatient intervention after the formation of PH, but fail to form a stable perioperative and continuous nursing process to prevent. The evidence of prevention and management of PH summarized in this study includes related controllable risk factors, diagnosis and identification, nutrition, increasing the muscle strength of the abdominal wall around the stoma, reducing abdominal pressure, the use of an abdominal belt and prevention of complications related to PH, which can provide effective coping methods for clinical nursing staff and improve the quality of nursing.

Conclusion

This study summarized the best evidence of prevention and management of PH in patients after enterostomy, and provided an evidence-based basis for clinical and home-based management of patients. Only 10 items of literature were included in this study, and high-quality original research is needed to provide high-quality evidence support in the future. The application of evidence requires the application department to combine the cultural background and willingness of patients in the department. It is suggested that domestic evidence practitioners should carry out personalized and comprehensive management of enterostomy patients, and promote the continuous quality improvement of prevention and management of PH of patients with enterostomy.

Disclosure of conflict of interest

None.

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