Supportive Care in Cancer (2019) 27:2463–2470
https://doi.org/10.1007/s00520-018-4520-7

ORIGINAL ARTICLE

Symptom screening for constipation in oncology: getting to the bottom of the matter

Madeline Li[1,2] · Caroline Sanders[1] · Chieh-Hsin Lee[1] · Bryan Gascon[1] · Alyssa Macedo[1] · Sean Molloy[3] · Stephane Laframboise[4] · Yvonne W. Leung[1,2,5]

Received: 3 March 2018 / Accepted: 18 October 2018 / Published online: 30 October 2018

Abstract

Purpose This study seeks to determine whether specific screening for constipation will increase the frequency of clinician response within the context of an established symptom screening program.

Methods A "constipation" item was added to routine Edmonton Symptom Assessment System (ESAS) screening in gynecologic oncology clinics during a 7-week trial period, without additional constipation-specific training. Chart audits were then conducted to determine documentation of assessment and intervention for constipation in three groups of patients, those who completed (1) ESAS ($n = 477$), (2) ESAS-C with constipation ($n = 435$), and (3) no ESAS ($n = 511$).

Results Among patients who were screened for constipation, 17% reported moderate to severe symptoms. Greater constipation severity increased the likelihood of documented assessment ($Z = 2.37$, $p = .018$) and intervention ($Z = 1.99$, $p = .048$). Overall rates of documented assessment were 36%, with the highest assessment rate in the no ESAS group ($\chi^2 = 9.505$, $p = .006$), a group with the highest proportion of late-stage disease. No difference in the rate of assessment was found between the ESAS and ESAS-C groups. Overall rates for documentation of intervention were low, and did not differ between groups.

Conclusions Specific screening for constipation within an established screening program did not increase the documentation rate for constipation assessment or intervention. The inclusion of specific symptoms in multi-symptom screening initiatives should be carefully evaluated in terms of added value versus patient burden. Care pathways should include guidance on triaging results from multi-symptom screening, and clinicians should pay particular attention to patients who are missed from screening altogether, as they may be the most symptomatic group.

Keywords Cancer · Oncology · Constipation · ESAS · Symptom screening · Patient-reported outcomes

Introduction

Prevalence of constipation among cancer patients can range from approximately 43% to 80% [1], depending on several factors, including immobility, opioid analgesics, inadequate fluid intake, poor nutrition, and symptoms related to the cancer itself [2]. In fact, cancer patients have indicated that symptoms of constipation cause them more distress than symptoms of pain [3].

Constipation has the potential to reduce the quality of life of cancer patients in a number of ways. A study investigating the effects of opioid-induced constipation found that constipation is a source of psychological distress in advanced cancer patients [4]. Distress associated with constipation was to the degree that study participants reported decreasing or discontinuing the use of opioid medications. This finding is an indication that constipation is a barrier to effective pain management, further compromising patients' quality of life. Consequences of long-term constipation such as nausea, abdominal pain, fecal impaction, and anorexia also contribute to reduced quality of life [5].

✉ Madeline Li
madeline.li@uhn.ca

[1] Department of Supportive Care, Princess Margaret Cancer Centre, University Health Network, 16th Floor, Room 749, 610 University Avenue, Toronto, ON M5G 2M9, Canada

[2] Department of Psychiatry, University of Toronto, Toronto, ON, Canada

[3] Quality, Patient Safety & Enterprise Risk, St. Joseph's Health Centre, Toronto, ON, Canada

[4] Department of Gynecologic Oncology, Princess Margaret Cancer Centre, Toronto, ON, Canada

[5] de Souza Institute, University Health Network, Toronto, ON, Canada

Effective pharmacologic and non-pharmacologic interventions for constipation exist [6, 7], and cancer care guidelines recommend screening for constipation at each patient visit [8]. Symptom screening of patient-reported outcomes in cancer is an emerging practice. However, there is only a scant evidence base to support the effectiveness of screening on symptom outcomes [9–11], raising debate about its implementation as a routine standard of care [12, 13]. Further progress in this area would benefit from dissection of which particular aspects of symptom screening contribute to clinical practice change.

Seow et al. demonstrated increases in clinician response processes such as symptom documentation in patients' charts and actions taken in response to high scores on screening with the Edmonton Symptom Assessment System (ESAS) [14], although overall rates of clinician response were low [15]. This study did not include a non-screened control group, and screening impact on clinician response was evaluated for the symptoms of pain and shortness of breath within the implementation process of newly establishing multi-symptom ESAS screening in routine care [16].

With the exception of research examining the under detection of emotional distress in cancer patients, there has been little research demonstrating the impact of screening for specific cancer–related physical symptoms, such as constipation. Such knowledge would support the widespread adoption of multiple symptom screening initiatives [17, 18]. In the standard form of the ESAS, there is the option to include additional symptoms, measured on a 0–10 Likert scale, as "other" items. Two studies have demonstrated the acceptability, reliability, and validity of the addition of constipation to ESAS in palliative care populations [19, 20], although neither examined clinician response processes.

The current study seeks to address the impact of routine screening for constipation on clinician assessment and management, independent of the increased attention to symptom management that can occur during introduction of a new symptom screening initiative. The gynecologic oncology clinic at the Princess Margaret Cancer Centre (PM) requested a time-limited addition of constipation to ESAS screening—a measure that had already been implemented as a routine standard of care within the Distress Assessment and Response Tool (DART) program since 2010 [21]. This provided a unique opportunity to evaluate the clinical impact of specific constipation screening, in the context of a pre-existing well-established symptom screening program. Clinicians in this clinic were already accustomed to reviewing and responding to the patient-reported screening output as part of routine care, based on the standard ESAS severity scores used for all symptoms. The purpose of this study is to determine (1) the prevalence and severity of constipation within gynecological oncology out-patients, and (2) whether specific screening for constipation increases the frequency of documented assessment and/or intervention by clinicians. It was hypothesized that routine screening for constipation would increase the frequency of documented constipation assessment and intervention by gynecologic oncology clinicians during real-world clinical practice.

Methods

Design and setting

Retrospective chart audits were conducted on patients attending the gynecologic oncology clinic at the Princess Margaret Cancer Centre (PM), a dedicated cancer treatment center in Ontario, Canada. The gynecologic oncology clinic sees approximately 3500 patients/year, averaging over 1600 ambulatory clinic visits per month. During the study period, DART screening rates in the gynecologic oncology clinic were maintained at 75%. Patient flow audits during DART implementation identified reasons for patients being missed from screening, including language barriers, patient refusal, lack of time, or feeling too unwell [21]. DART is comprised of validated measures of physical, emotional, and practical concerns, linked to an inter-professional care path graded to the patient's level of distress. Research Ethics Board approval was obtained for retrospective medical chart reviews.

Constipation screening

DART is a patient-reported outcome screening tool which includes the ESAS, originally developed to assess nine common symptoms (pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, well-being, and shortness of breath) in palliative care patients, each rated on a numerical scale from "0-symptom is absent" to "10-worst possible severity" [15]. During the investigation period, patients were directed by the reception staff to complete ESAS on paper in the waiting rooms, for nurses or oncologists to review the completed survey in real time. Several studies have demonstrated the reliability, validity, and overall utility of the ESAS as an assessment tool [22, 23].

Additional items of "constipation" and "numbness/tingling" were added to ESAS as "other" items, rated on a 0 to 10 scale. This was done on a trial basis from December 17, 2012 to February 6, 2013. The usual ESAS symptom severity cutoff scores were used to categorize constipation severity: 1–3 to indicate mild, 4–6 to indicate moderate, and 7–10 to indicate severe constipation [24, 25]. No additional training or education was provided to clinic staff about constipation management beyond the usual Cancer Care Ontario symptom management guidelines [26], which include a bowel care guideline [8] that has routinely been available to staff in clinic as part of DART clinical response for all ESAS symptoms. However, gynecologic oncologists routinely assess and

manage constipation within their scope of practice and were supported by the availability of palliative care referral.

Chart reviews

A total of 1423 chart audits were conducted on three different groups of patients seen by the gynecologic oncology clinic. During the constipation screening period (December 17, 2012 to February 6, 2013), a total of $n = 435$ gynecologic oncology patients completed ESAS with the addition of the constipation item (ESAS-C). Comparison groups were sequentially selected from the time period immediately prior to implementation of ESAS-C, including a convenience sample of $n = 477$ patients who completed the ESAS without constipation item (ESAS) from November 12 to December 16, 2012, and a group of $n = 511$ patients who did not complete any screening (No ESAS) from November 12 to February 6, 2013. Audits were conducted on unique patients, based on their last DART screen during the study window.

A constipation chart audit tool was developed based on the Cancer Care Ontario bowel care symptom management guidelines [8], in order to examine the presence and nature of the discussion about constipation between patients and their healthcare professionals. Chart audits for documentation of assessment and intervention were used as proxies for evidence of symptom management. Although not a published or validated measure of clinical intervention, Cancer Care Ontario requires regional cancer centers to conduct annual chart audits using similar chart audit tools for each of the ESAS symptoms to measure quality performance in the cancer system. Information on documentation of constipation assessment and intervention was recorded (Table 1). Assessment was categorized as any discussion of constipation or detailed discussion of constipation, defined as the documentation of more than one aspect of a patient's constipation on the chart audit form (i.e., intrusiveness/discomfort, bowel management practices tried, pharmacologic, or non-pharmacologic interventions).

The following clinical and demographic data was also extracted on all patients from the hospital cancer registry: date of birth, primary diagnosis, diagnosis date, and staging information. This information was used to provide a profile of the sample population for generalizability of results, as well as to determine predictors of constipation and clinical chart documentation.

Statistical analysis

Non-parametric tests, including Wilcoxon two-sample test, Kruskal-Wallis test, chi-square test, or Fisher's exact test, were conducted to assess significant differences among groups. If a significance was found, a post hoc Tukey style multiple comparisons of proportions or Kruskal-Wallis analysis with multiple comparisons tests were used to determine which two groups were significantly different from each other. Significant associations were also subject to logistical regression adjusting for systematic differences among groups. All analyses were conducted using SAS 9.2 (SAS Institute Inc., Cary, NC, USA).

Results

Figure 1 depicts the prevalence of symptoms in the ESAS-C group, where 42.1% of the sample reported some degree of constipation. Based on the ESAS-C cutoff scores used in this study, 57.9% of patients had no constipation, 25.1% of patients had mild, 10% had moderate constipation, and 7.1% had severe constipation.

Demographic and medical comparisons between groups are shown in Table 2. Overall, there was no age difference by patient groups ($F = 2.04$, $p = .36$). Among the 1423 patients matched to a record in the cancer registry at Princess Margaret, the time since diagnosis was significantly different among groups ($\chi^2 = 12.16$, $df = 2$, $p = .002$). The Kruskal-Wallis analysis with multiple comparisons showed that the ESAS only group had significantly longer time since diagnosis compared to the ESAS-C group ($q = 3.49$, $p < .05$). The proportion of late-stage disease (stage 3 or 4 cancer) was also significantly different between groups ($\chi^2 = 9.54$, $df = 2$, $p = .008$). The post hoc multiple comparisons test with Bonferroni adjustment showed that those in the No ESAS group had a significantly higher proportion of late-stage disease compared to the ESAS group ($\chi^2 = 9.50$ $df = 2$, $p = .006$).

Approximately, 60% of patients in both ESAS and ESAS-C groups reported other ESAS symptoms at a severity > 4, and these groups did not differ in the rate of documented discussion of constipation ($p = 0.76$) (Table 2). Assessment and intervention for constipation was documented only by physicians (Table 3).

The frequency of discussions about constipation was significantly different among the three groups ($\chi^2 = 7.24$, $df = 2$, $p = .027$), with the highest rate of discussions occurring in the No ESAS group (40.3%), compared to ESAS-C (34.3%), and ESAS (32.5%) groups. A Tukey style multiple comparisons of proportions test showed that only the No ESAS (40.3%) and ESAS (32.5%) groups were significantly different in proportions ($q = 3.61$, $p < .05$).

Among those who had physician discussion, the frequency of detailed constipation discussion was significantly different among the three groups ($\chi^2 = 7.61$, $df = 2$, $p = .022$), with the highest rate of detailed constipation discussion occurring in the ESAS-C group (16.8%), compared to No ESAS (15.5%) and ESAS only (7.1%) groups. However, a logistical regression model adjusting for time since diagnosis, disease stage, and type showed that there were no significant differences in

Table 1 Constipation chart audit tool

CHART AUDIT TOOL: CONSTIPATION ASSESSMENT & INTERVENTION								
Chart Number:	Date ESAS Screen Constipation ESAS Score:	Did the patient have other ESAS ≥ 4 symptoms? Y or N						
Date Chart Abstracted: Chart Abstracted by:	☐ Chronic and previously addressed. Date documented: ☐ Not Related to Cancer Diagnosis ☐ Being followed by Primary Care Provider/Community							
Assessment								
Is it described if constipation was discussed? (e.g., severity, frequency, quality of stools, etc.)	☐ YES	☐ NO						
Is it described if the intrusiveness/discomfort of the constipation was discussed?	☐ YES	☐ NO						
Is it described if the patient has already tried other bowel management practices?	☐ YES	☐ NO						
Intervention								
Pharmacologic Is it described if pharmacological interventions were used? (e.g., oral colonic stimulant/osmotic, suppositories/enemas, methylnaltrexone)	☐ YES	☐ NO	☐ Patient declined					
Non-Pharmacologic Is it described if non-pharmacological interventions were used? (e.g., fluid intake, physical activity, diet, personal considerations)	☐ YES	☐ NO						
Which disciplines documented assessment and/or intervention?								
Nursing	☐ YES	☐ NO	**Physicians**	☐ YES	☐ NO	**Allied Health**	☐ YES	☐ NO

the frequency of detailed discussion among the three groups (Table 4). The only predictor of detailed constipation discussion was disease stage, with the highest rate of detailed constipation discussion among those who had late-stage disease vs. those with early-stage disease ($p < .05$).

Overall rates of intervention for constipation were very low, occurring in only 1.2%, 1.8%, 4.7%, and 6.5% of patients with none, mild, moderate, and severe constipation, respectively. There were no significant group differences on the rate of documented discussion of interventions for constipation among those who had constipation assessment ($p = 0.06$). However, among the ESAS-C group, a Wilcoxon two-sample test showed that greater constipation severity was significantly associated with documentation of both constipation assessment ($Z = 2.37$, $p = .018$) and intervention ($Z = 1.99$, $p = .047$).

Discussion

The present study demonstrates that constipation is a prevalent symptom in gynecologic oncology patients, affecting almost half of patients to some degree of severity. In the context of an established symptom screening program, specific screening for constipation did not impact the overall rate of assessment, nor did it impact the rate of detailed constipation discussion by clinicians when time since diagnosis, disease severity, and type were adjusted. Although the ESAS-only group had a statistically significant longer time since diagnosis than the ESAS-C group, the clinical significance of their ~8 month difference (2.34 years in ESAS-C vs. 2.97 years in ESAS only) is unclear given that there was no significance difference in the proportion of late-stage disease between these two groups according to the post hoc test of significance. Symptom screening leads to improved symptom management only if followed by response steps of clinical assessment, offer of intervention, and then uptake of intervention. This is one of the first studies to begin to dissect this process for a specific symptom within an established multiple symptom screening program. Studies are beginning to emerge demonstrating the impact of multiple symptom screening on outcomes such as reducing emergency room visits [11, 27] and improving both health-related quality of life and survival in cancer [28, 29], although these may be non-specific findings associated with increased clinical attention during the process of implementing a new symptom screening initiative. The value added of individual symptom screening for reducing symptom severity remains controversial [30].

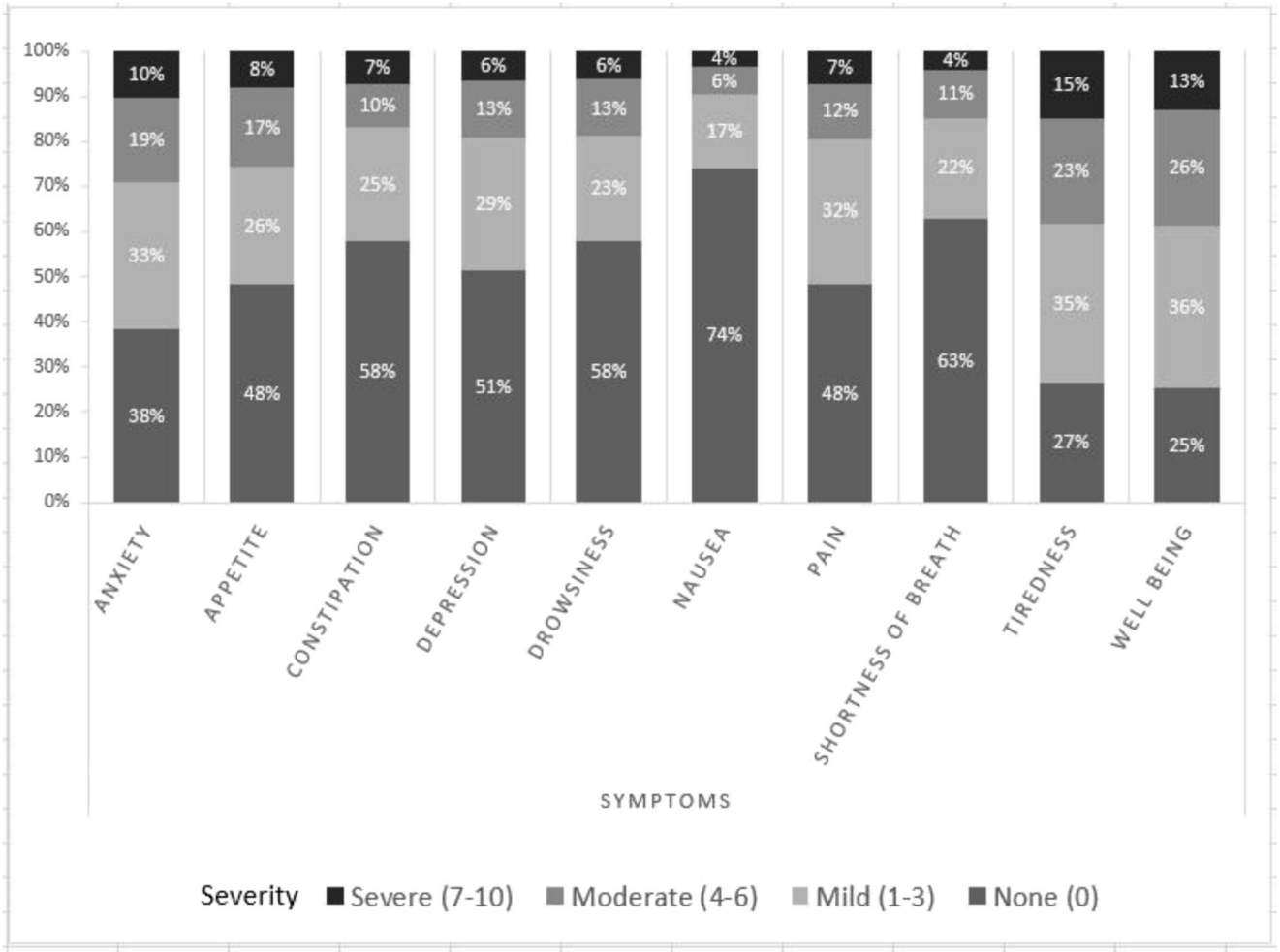

Fig. 1 The frequency of ESAS symptom severity among the gynecological oncology patients screened by ESAS-C ($n = 435$)

Surprisingly, the highest documentation rate for constipation assessment was found in the patient group that did not complete ESAS screening at all. This patient group also had the highest proportion of late-stage disease (29.9%), suggesting that this group may have been the most symptomatic, although it is also possible that this group was seen more frequently in clinic, increasing opportunities to attend to symptoms. However, we also found that patients who had an advanced stage of disease (stage 3 or 4) and/or greater constipation severity were more likely to have constipation discussed by clinicians. When symptoms are severe, they are more likely to be recognized during routine clinic visits. The goal of screening is to increase the detection of unrecognized symptoms. These are more likely to be moderate in severity, but are also more prevalent and harder to detect during routine clinical encounters. Early detection of symptoms permits early intervention to prevent problems from becoming severe.

Discussion of intervention for constipation, even when severe, was found to be very low in this sample. No clinical guidance or additional training on constipation management was provided to clinicians during the audit period. It is unclear if this represents the absence of intervention, or just no documentation of intervention. It may also be that other symptoms with higher priority for patients were being addressed, as almost 60% of patients reported other ESAS symptoms at >= 4 severity. It has been recognized that screening alone, without integrating a systematic approach to assessment and intervention, is unlikely to improve symptom outcomes [30].

Strengths of the current study include the large sample size collected in real-world practice. No previous studies have reported on the value added of incorporating a single extra symptom into a pre-existing symptom screening program. Limitations of this study include the use of chart documentation as a proxy for events during a clinical encounter, which may underestimate the true frequency of assessment and intervention. It was also not possible to analyze whether assessment was associated with increased intervention as documentation of these practices were not independent events in the chart audit methodology. Another limitation is the lack of balance between key variables among groups, which often arises from non-randomized real-world observational studies. In addition, the constipation cutoff scores used to categorize constipation severity in this study were not

Table 2 Demographic and medical characteristics of groups

	1. ESAS constipation		2. ESAS only		3. No ESAS		All			
	$n = 435$ (30.6%)		$n = 477$ (33.5%)		$n = 511$ (35.9%)		$n = 1423$		p value	Sig. post hoc test
	Mean/N	Std/%	Mean/N	Std/%	Mean/N	Std/%	Mean/N	Std/%		
Age	64.72	13.7	65.80	13.44	66.26	13.08	65.59	13.42	0.23	
Time since dx (year)	2.34	3.52	2.97	3.75	2.76	3.62	2.70	3.64	0.002	1 vs. 2 ($q = 3.49$, $p < 0.05$)
Cancer Site (n, %)									0.06	1 vs. 2 ($p = 0.03$)
Cervix/vagina	67	18.66	69	18.85	76	20	212	19.19		
Other genital	4	1.5	8	2.19	5	1.32	17	1.54		
Ovary	160	44. 57	122	33.33	162	42.63	444	40.18		
Uterus/endometrium	128	35.65	167	45.63	137	36.05	432	39.10		
Stage III or IV (n, %)	78	24.53	67	19.71	102	29.91	247	24.72	0.008	2 vs. 3 ($p = 0.006$)
Severity of constipation										
None to mild	360	82.76	–	–	–	–				
Moderate	44	10.11	–	–	–	–				
Severe	31	7.13	–	–	–	–				
Other ESAS item > 4 (n, %)	261	60.42	275	58.51	–	–	536	59.42	0.56	
Constipation discussed	89	60.96	90	59.21	–	–	179	60.07	0.76	

Table 3 Summary of constipation chart audit outcomes

	1. ESAS constipation		2. ESAS only		3. No ESAS		All			
	$n = 435$ (32.7%)		$n = 477$ (32.5%)		$n = 511$ (34.8%)		$n = 1423$		p	Sig. post hoc test
	N	%	N	%	N	%	N	%		
Constipation assessment[1]	149	34.3	155	32.5	206	40.3	510	35.9	0.02	2 vs. 3 ($q = 3.61$, $p < 0.05$)
Detailed discussion[2] (any of the below, $n = 510$)	25	16.8	11	7.1	32	15.5	68	13.3	0.02	1 vs 2 ($p = 0.15$) 1 vs. 3 ($p = 0.10$) 2 vs.3 ($p = 0.76$) Late- vs. early-stage disease ($p < 0.05$)
Intrusiveness/discomfort	4	2.7	0	0	1	0.5	5	1	0.05	
Bowel management	17	11.4	10	6.5	27		54	13.1	0.12	
Intervention discussed	9	6	2	1.3	6	2.9	17	3.3	0.06	
Pharmacologic	6	4	2	1.3	4	1.9	12	2.4	0.30	
Non-pharmacologic	3	2	0	0	3	1.5	6	1.2	0.22	

No data were available for frequency of chronic, non-cancer related, or constipation being managed in the community

[1] Constipation assessment was defined as the documentation of a discussion related to at least one aspect of a patient's constipation as per the chart audit tool (i.e., intrusiveness/discomfort, bowel management tried, pharmacologic, or non-pharmacologic interventions)

[2] Detailed discussion was defined as the documentation of more than one aspect of a patient's constipation on the chart audit form

Table 4 Results of logistic regression of the outcome of detailed discussion with adjustment for covariates

Parameter		DF	Estimate	SE	Wald	*p* value	Odds ratio	95% CI
Group	ESAS constipation vs. no ESAS	1	0.32	0.23	1.84	0.18	1.49	0.69–3.20
Group	ESAS only vs. no ESAS	1	−0.24	0.25	0.92	0.34	0.85	0.37–1.94
Time since diagnosis		1	−0.08	0.07	1.44	0.23	0.92	0.81–1.05
Disease type	Cervix/vagina vs. uterus/endometrium	1	0.08	0.29	0.07	0.79	1.00	0.40–2.51
Disease type	Ovary vs. uterus/endometrium	1	−0.15	0.25	0.35	0.56	0.80	0.36–1.79
Advanced	Yes vs. no	1	0.42	0.20	4.42	0.03	2.31	1.06–5.05

necessarily constipation specific, which may have made interpretation of clinically meaningful constipation scores difficult. Generalizability of these results to other cancer types, as well as to other cancer centers without an established screening program is also limited.

This study did not demonstrate practice change with screening for constipation, but did identify that clinicians should pay particular attention to patients who are missed from screening altogether, as they may be the most symptomatic group. Given the increased patient burden with inclusion of multiple symptoms in a screening initiative, future studies should focus on the value added of screening for specific symptoms to inform prioritization efforts as collection of patient-reported outcomes in cancer care is rapidly gaining momentum [31]. This will require supported clinician guidance on how to triage the results from multi-symptom screening tools in care pathways.

Compliance with ethical standards

Conflict of interest Dr. Madeline Li reports sponsorship from Cancer Care Ontario, during the conduct of the study. None of the other authors have any financial disclosures or conflicts of interests to declare.

References

1. McMillan SC, Tofthagen C, Small B, Karver S, Craig D (2013) Trajectory of Medication-induced Constipation. In: Book Trajectory of Medication-induced Constipation. NIH Public Access, City, pp E92
2. Fallon MT (1999) Constipation in cancer patients: prevalence, pathogenesis, and cost-related issues. Eur J Pain 3:3–7
3. McMillan SC, Rivera HR Jr (2009) The relationship between depressive symptoms and symptom distress in patients with cancer newly admitted to hospice home care. J Hosp Palliat Nurs 11:41–51
4. Dhingra L, Shuk E, Grossman B, Strada A, Wald E, Portenoy A, Knotkova H, Portenoy R (2013) A qualitative study to explore psychological distress and illness burden associated with opioid-induced constipation in cancer patients with advanced disease. Palliat Med 27:447–456
5. Thomas J (2007) Cancer-related constipation. Curr Oncol Rep 9: 278–284
6. Clemens KE, Faust M, Jaspers B, Mikus G (2013) Pharmacological treatment of constipation in palliative care. Curr Opin Support Palliat Care 7:183–191
7. Woolery M, Lyons HF, Lindsay Gaido MSNR, Mary Yenulevich B, Fulton S (2008) Putting evidence into practice®: evidence-based interventions for the prevention and management of constipation in patients with cancer. Clin J Oncol Nurs 12:317–337
8. Cancer Care Ontario Symptom Management Guide-to-Practice: Bowel Care April, 2012. Available at https://www.cancercare.on.ca/toolbox/symptools/
9. Hollingworth W, Metcalfe C, Mancero S, Harris S, Campbell R, Biddle L, McKell-Redwood D, Brennan J (2013) Are needs assessments cost effective in reducing distress among patients with cancer? A randomized controlled trial using the distress thermometer and problem list. J Clin Oncol 31:3631–3638
10. Cleeland CS, Wang XS, Shi Q, Mendoza TR, Wright SL, Berry MD, Malveaux D, Shah PK, Gning I, Hofstetter WL (2011) Automated symptom alerts reduce postoperative symptom severity after cancer surgery: a randomized controlled clinical trial. J Clin Oncol 29:994–1000
11. Basch E, Deal AM, Kris MG, Scher HI, Hudis CA, Sabbatini P, Rogak L, Bennett AV, Dueck AC, Atkinson TM (2015) Symptom monitoring with patient-reported outcomes during routine cancer treatment: a randomized controlled trial. J Clin Oncol 34:557–565
12. Carlson L, Waller A, Groff S, Zhong L, Bultz B (2013) Reply: benefits of screening cancer patients for distress still not demonstrated. Br J Cancer 108:738–739
13. Coyne J (2013) Benefits of screening cancer patients for distress still not demonstrated. Br J Cancer 108:736–737
14. Seow H, Sussman J, Martelli-Reid L, Pond G, Bainbridge D (2012) Do high symptom scores trigger clinical actions? An audit after implementing electronic symptom screening. J Oncol Pract 8: e142–e148
15. Bruera E, Kuehn N, Miller MJ, Selmser P, Macmillan K (1991) The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients. J Palliat Care
16. Pereira J, Green E, Molloy S, Dudgeon D, Howell D, Krzyzanowska MK, Mahase W, Tabing R, Urowitz S, Macdougall L (2014) Population-based standardized symptom screening: Cancer Care Ontario's Edmonton Symptom Assessment System and performance status initiatives. J Oncol Pract 10:212–214
17. Barbera L, Seow H, Howell D, Sutradhar R, Earle C, Liu Y, Stitt A, Husain A, Sussman J, Dudgeon D (2010) Symptom burden and performance status in a population-based cohort of ambulatory cancer patients. Cancer 116:5767–5776
18. Butt Z, Wagner LI, Beaumont JL, Paice JA, Peterman AH, Shevrin D, Von Roenn JH, Carro G, Straus JL, Muir JC (2008) Use of a single-item screening tool to detect clinically significant fatigue, pain, distress, and anorexia in ambulatory cancer practice. J Pain Symptom Manag 35:20–30
19. Hannon B, Dyck M, Pope A, Swami N, Banerjee S, Mak E, Bryson J, Rodin G, Ridley J, Lo C (2015) Modified Edmonton Symptom

Assessment System including constipation and sleep: validation in outpatients with cancer. J Pain Symptom Manag 49:945–952
20. Stiel S, Matthes M, Bertram L, Ostgathe C, Elsner F, Radbruch L (2010) Validation of the new version of the minimal documentation system (MIDOS) for patients in palliative care: the German version of the Edmonton Symptom Assessment Scale (ESAS). Schmerz 24: 596–604
21. Li M, Macedo A, Crawford S, Bagha S, Leung YW, Zimmermann C, Fitzgerald B, Wyatt M, Stuart-McEwan T, Rodin G (2016) Easier said than done: keys to successful implementation of the distress assessment and response tool (DART) program. J Oncol Pract 12:e513–e526
22. Watanabe SM, Nekolaichuk CL, Beaumont C (2012) The Edmonton Symptom Assessment System, a proposed tool for distress screening in cancer patients: development and refinement. Psycho-Oncology 21:977–985
23. Dudgeon D, King S, Howell D, Green E, Gilbert J, Hughes E, Lalonde B, Angus H, Sawka C (2012) Cancer Care Ontario's experience with implementation of routine physical and psychological symptom distress screening. Psycho-Oncology 21:357–364
24. Serlin RC, Mendoza TR, Nakamura Y, Edwards KR, Cleeland CS (1995) When is cancer pain mild, moderate or severe? Grading pain severity by its interference with function. Pain 61:277–284
25. Selby D, Cascella A, Gardiner K, Do R, Moravan V, Myers J, Chow E (2010) A single set of numerical cutpoints to define moderate and severe symptoms for the Edmonton Symptom Assessment System. J Pain Symptom Manag 39:241–249
26. Cancer Care Ontario (2012) Constipation Symptoms in Adults with Cancer. Available from: https://www.cancercare.on.ca/toolbox/symptools/. Accessed 31 Jul 2017
27. Barbera L, Sutradhar R, Howell D, Sussman J, Seow H, Dudgeon D, Atzema C, Earle C, Husain A, Liu Y (2015) Does routine symptom screening with ESAS decrease ED visits in breast cancer patients undergoing adjuvant chemotherapy? Support Care Cancer 23:3025–3032
28. Basch E, Deal AM, Dueck AC, Scher HI, Kris MG, Hudis C, Schrag D (2017) Overall survival results of a trial assessing patient-reported outcomes for symptom monitoring during routine cancer treatment. Jama 318:197–198
29. Meijer A, Roseman M, Milette K, Coyne JC, Stefanek ME, Ziegelstein RC, Arthurs E, Leavens A, Palmer SC, Stewart DE (2011) Depression screening and patient outcomes in cancer: a systematic review. PLoS One 6:e27181
30. Carlson LE (2013) Screening alone is not enough: the importance of appropriate triage, referral, and evidence-based treatment of distress and common problems. In: Book Screening alone is not enough: the importance of appropriate triage, referral, and evidence-based treatment of distress and common problems. American Society of Clinical Oncology, City
31. Reeve BB, Wyrwich KW, Wu AW, Velikova G, Terwee CB, Snyder CF, Schwartz C, Revicki DA, Moinpour CM, McLeod LD (2013) ISOQOL recommends minimum standards for patient-reported outcome measures used in patient-centered outcomes and comparative effectiveness research. Qual Life Res 22:1889–1905