Am J Cancer Res 2023;13(12):6346-6353
www.ajcr.us /ISSN:2156-6976/ajcr0153073

Original Article

Predictive value of the Rothman index for unplanned 90-day readmission rates following hospital discharge in oral cancer patients

Tian Zhao[1,2,3], Lin Lu[3], Jun Zhang[1,2,3], Yiming Gao[1,2,3]

[1]Department of Stomatology, Ruijin Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai 200025, China; [2]College of Stomatology, Shanghai Jiao Tong University, Shanghai 200125, China; [3]Ruijin Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai 200025, China

Received August 22, 2023; Accepted December 3, 2023; Epub December 15, 2023; Published December 30, 2023

Abstract: This study aims to evaluate the predictive capability of the Rothman Index in determining unplanned readmissions within 90 days after discharge for oral cancer patients. The consecutive recruitment was carried out from May 1, 2020, to May 31, 2023, at the outpatient department of Ruijin Hospital of Medical College of Shanghai Jiao Tong University Shanghai Hospital. The evaluation is based on internationally recognized clinical evaluation indicators. A total of 125 recruited patients were grouped as per the presence (n=13) or absence (n=112) of unplanned readmissions within 90 days after discharge. Electronic medical records and patient follow-up records were used to collect details, including gender, age, body mass index, associated conditions such as diabetes and hypertension, treatment approach, and pathological type. In addition, the Rothman Index, postoperative complications, and rates of unplanned readmissions within 90 days post-discharge were assessed following previous literature. Although there was no significant difference in gender, body mass index, and length of hospital stay between the groups ($P > 0.05$), age, smoking and alcohol consumption history, and the Rothman Index exhibited significant variations ($P < 0.05$). The Rothman Index was found to be the most strongly correlated with unplanned readmissions within 90 days and could be incorporated in a prediction model. The area under the curve (AUC), as highlighted in the receiver operating characteristic (ROC) curve analysis, for predicting unplanned readmissions within 90 days post-discharge was 0.930, using Rothman Index. This suggests that the Rothman Index could be an effective tool in managing risk in clinical settings due to its potential to accurately predict the rate of unplanned readmissions for oral cancer patients within 90 days of discharge.

Keywords: Rothman index, oral cancer, unplanned readmissions, complication

Introduction

Oral Squamous Cell Carcinoma (OSCC), universally referred to as oral cancer, is a pernicious tumor affecting various regions of the oral cavity, including the lips, hard palate, upper and lower alveolar ridges, anterior two-thirds of the tongue, floor of the mouth, buccal mucosa, retromolar trigone, and base of the tongue [1]. Holding a significant place among the head and neck malignancies, its common pathological type is OSCC. Major risk factors contributing to OSCC include tobacco usage, alcohol consumption, betel nut chewing, and HPV infection [2].

In 2020, there were 377,713 new cases of and 177,757 deaths from oral cancer globally [3]. A surge in incidence has been evidenced in developing nations, with China notably experiencing a substantial annual rise in number of cases. Early-stage OSCC is typically addressed through surgical interventions, whereas radiation therapy is preferred for patients who are surgery-ineligible. Patients with advanced-stage OSCC might undergo a combination of surgery, chemotherapy, and radiation therapy as an initial treatment plan [4, 5].

In recent years, cancer treatment has seen significant progress in medical technology and fundamental sciences, yielding a multidisciplinary approach that amalgamates surgical procedures, chemotherapy, radiation therapy, and immunotherapy [6-8]. These developments

have markedly ameliorated the prognosis and quality of life in patients with oral cancer and other tumor types. However, nearly two-thirds of OSCC patients are diagnosed with cervical lymph node metastasis [9], a recognized prognostic factor for OSCC contributing to lower survival rates. The overall 5-year survival rate for OSCC is approximately around 60% [10, 11].

Despite advancements, patients regularly encounter unplanned readmissions or repeated surgeries due to the inherent complexities of cancer treatment and the high metastasis probability [12]. Such unplanned readmissions not only enhance patients' healthcare burden but also influence their overall prognosis negatively. These unforeseen readmissions within 90 days post-discharge due to the same or related diseases are increasingly used to gauge healthcare quality, reflecting both the effectiveness of treatment and prognosis and indicating quality management in hospitals [13].

Attempting to reduce unplanned readmissions is an important initiative in progressing healthcare quality, which not only benefits disease prognosis but also addresses medical resource scarcity, mitigating patients' social-economic pressures and burdens [14, 15]. However, an efficient method to predict these readmissions among discharged oral cancer patients is currently missing in clinical practice.

The Rothman Index is a comprehensive predictive algorithm that incorporates vital signs, laboratory tests, and nursing assessments to evaluate a patient's overall health and predict their risk of adverse outcomes. The Rothman Index can play a significant role. As an acuity measure, it predicts patient risk, enhances safety, and improves patient care quality. Based on routinely collected electronic medical record data, it provides an overall health status score for patients, with a score ranging from -91 to 100. A higher score indicates better health. This index assists in monitoring patient health over time, detecting subtle changes, and identifying patients at higher risk for severe health decline. It is instrumental in decision-making processes like projecting readmission risk and determining the need for additional interventions or resources.

This study aimed at understanding the role of the Rothman Index in predicting readmissions within 90 days of discharge in oral cancer patients, bridging the gap, and providing prognostic insights to assist clinical practice.

Methods

Inclusion and exclusion criteria

Participants eligible for this retrospective study met the following inclusion criteria: a confirmed diagnosis of oral cancer, completed surgical intervention and/or radiotherapy/chemotherapy, 18 years or older, and successful follow-up completion for a minimum of 90 days. The exclusion criteria were as follows: patients without available medical records due to transfer to other medical institutions or departments, individuals not considered readmitted if their visits were regular follow-ups, patients inflicted with significant cognitive impairment or diseases profoundly impacting their ability to follow up, and those with unstable vital signs.

General data

From May 1, 2020, to May 31, 2023, we consecutively recruited patients with oral cancer who received treatment and were subsequently discharged from the Department of Oral Medicine at Ruijin Hospital Affiliated to Shanghai Jiao Tong University School of Medicine following the inclusion criteria. Based on unplanned readmission within 90 days after discharge, a total of 125 recruited patients were divided into two groups: a readmission group (n=13) and a non-readmission group (n=112). Among these cases, 79 (63.2%) were male and 46 (36.8%) were female. The age of the patients ranged from 16 to 86 years, with a mean age of (65.42±12.65) years. All patients underwent confirmatory diagnosis of oral cancer through follow-up examinations. This study was approved by the Ruijin Hospital Affiliated to Shanghai Jiao Tong University School of Medicine Ethics Committee.

Methods

After meeting the discharge criteria, all patients underwent a 90-day follow-up starting from the day of discharge. The evaluation of unplanned readmission was performed by two non-patient physicians from the same department to ensure that it was unpredictable.

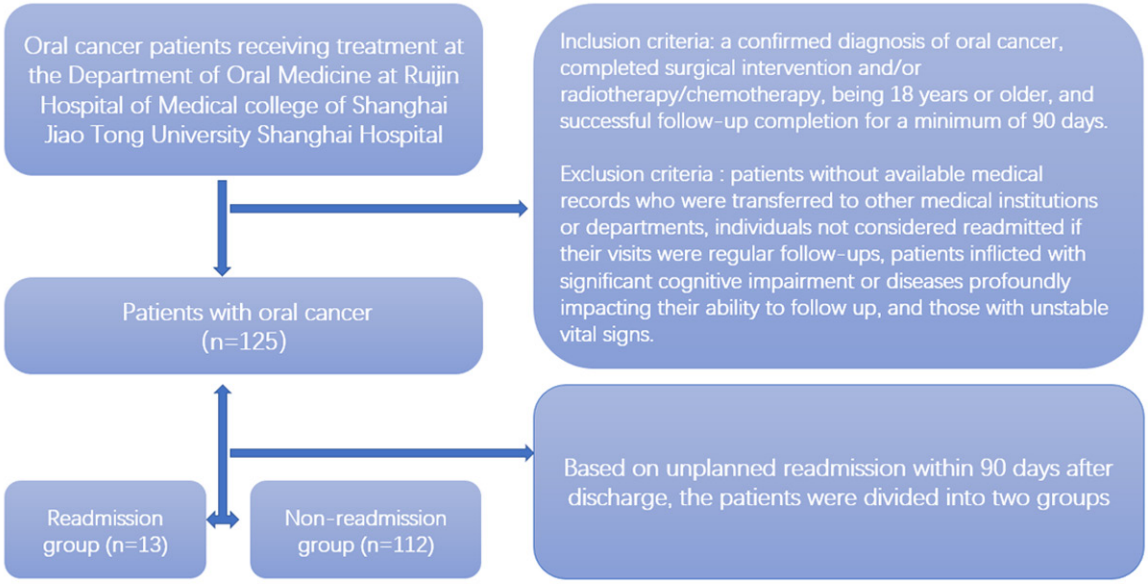

Figure 1. The flow chart illustrating the study's design and process.

Outcome measures and data extraction

The following data were gathered through a comprehensive review of the electronic medical records system and patient follow-up records. The collected information encompassed various demographic factors, such as height, weight, gender, age, smoking history, and alcohol consumption history. Additionally, clinical indicators, including tumor staging, pathological type, surgical methods, and radiotherapy/chemotherapy regimens, were collected. In order to assess the health status of each patient at discharge, the primary outcome was the predicting performance of the Rothman Index for the readmission. A flow chart illustrating the study's design and process is shown in **Figure 1**.

Statistical analysis

Data analysis was performed using SPSS 25.0 statistical software. Categorical data were depicted as [n (%)] and examined utilizing the chi-square test. Continuous data were exhibited as mean ± standard deviation and compared among groups using the t-test. The accuracy of the predictive model was assessed using the area under the ROC curve, with a significance level established at $P < 0.05$ to denote statistical significance of disparities. Spearman correlation analysis was used to reveal the correlation analysis between complications and readmission status. Besides, the univariate and multivariate logistic regression analysis were also established.

Results

Univariate descriptive statistical analysis of 90-day readmission in oral cancer patients

There was no significant difference in gender between the readmission group and the non-readmission group ($P > 0.05$). However, significant differences were observed in age, smoking history, and alcohol consumption history between the two groups ($P < 0.05$), as shown in **Table 1**.

Univariate exploratory analysis of 90-day readmission in oral cancer patients

Several factors, including the Rothman index (with actual values), histological type (poorly differentiated =1, moderately differentiated =2, well differentiated =3), treatment modality (surgery, radiation therapy, chemotherapy, immunotherapy, with each modality represented as 1), and family support (frequent visits =2, occasional visits =1, no visits =0), were examined to identify their impact on readmission. Significant differences were observed among these four influencing factors ($P < 0.05$), with the Rothman index showing a particularly significant impact ($P < 0.01$), as shown in **Table 2**.

Table 1. Univariate analysis of factors associated with 90-day hospital readmissions in oral cancer patients

Variable	Statistical index	Readmission group (n=13)	Non-readmission group (n=112)	*P*
Gender	Male/female	8/5	71/41	0.896
Age	Mean ± SD	72.39±7.56	61.16±6.97	< 0.001
Body Mass Index (kg/m^2)	Mean ± SD	22.45±3.45	22.76±3.50	0.884
Smoking history	Yes/no	8/5	32/80	< 0.001
Drinking history	Yes/no	6/7	34/78	< 0.001
Residential Area	Urban/Rural	7/6	59/53	0.963
Hypertension	Quantity	3	28	0.882
Diabetes	Quantity	2	20	0.745
Coronary Artery Disease	Quantity	2	16	0.896
Anemia	Quantity	8	71	0.894
Impaired Liver and Kidney Function	Quantity	2	18	0.905

Table 2. Exploratory univariate analysis of factors associated with 90-day hospital readmissions in oral cancer patients

Variable	Readmission group (n=13)	Non-readmission group (n=112)	*P*
Pathological type	2.12±0.23	1.85±0.19	< 0.001
Rothman index	43.83±8.94	56.97±12.30	< 0.001
Therapy method	2.45±0.32	3.12±0.25	< 0.001
Family members accompany	0.85±0.12	1.55±0.19	< 0.001

Table 3. Correlation analysis of each factor influencing unplanned readmission within 90 days

Readmission		
Rothman index	Correlation coefficient	-0.977**
	p	< 0.001
Pathological pattern	Correlation coefficient	-0.530
	p	0.115
Treatment method	Correlation coefficient	0.075
	p	0.837
Family members accompany	Correlation coefficient	-0.636*
	p	0.048

Note: * Indicates P < 0.05, ** Indicates P < 0.01.

Correlation analysis of factors influencing unplanned readmission within 90 days

Correlation analysis was conducted to explore the relationship between unplanned readmission (assigned as 1) and the following factors: the Rothman index (with actual values), histological type (poorly differentiated =1, moderately differentiated =2, well differentiated =3), treatment modality (surgery, radiation therapy, chemotherapy, immunotherapy, each considered as 1), and family support (frequent visits =2, occasional visits =1, no visits =0). The results of this analysis are shown in **Table 3**. Pearson correlation coefficient was employed to indicate the strength of the relationship. Specifically, the correlation coefficient between unplanned readmission and the Rothman index was found to be -0.977, demonstrating a significant negative correlation at the 0.01 level. This suggests a significant relationship between unplanned readmission and the Rothman index.

ROC analysis for Rothman index prediction

The analysis of the ROC curve revealed that the AUC corresponding to the readmission prediction using the Rothman index was 0.930 (**Figure 2**). This indicates a high diagnostic value, and the optimal threshold for the Rothman index was determined to be 0.875. At this threshold, the sensitivity was 0.863 and the specificity was 0.822. **Table 4** presents the results of the optimal threshold in the ROC analysis.

Complication rates between the unplanned readmission and non-readmission groups

The occurrence rates of complications with the top 3 smallest *p* value for the difference

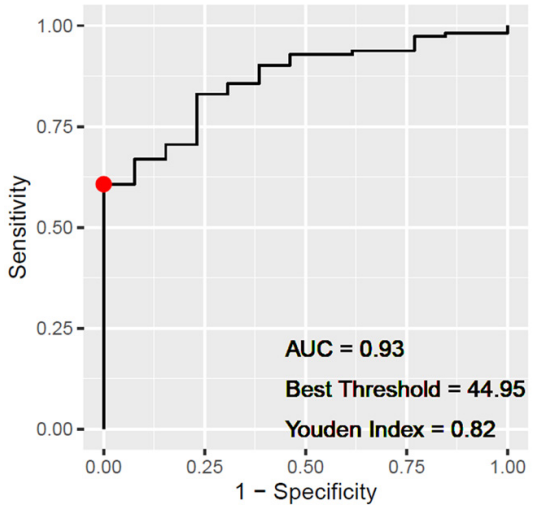

Figure 2. ROC diagram of Rothman index to predict unplanned readmissions.

between the unplanned readmission group and the non-readmission group are presented in **Table 5**.

Correlation analysis between complications and readmission status

A correlation analysis was conducted to examine the relationship between Dysfunction of speech, chewing and swallowing, Dystrophy, Flap and vascular crisis, and the occurrence of readmission. Pearson correlation coefficients were used to measure the strength of the correlations. The results of the analysis are as follows:

There was no significant correlation between Dysfunction of speech, chewing and swallowing and readmission. The correlation coefficient was 0.288, which is close to 0, and the *p*-value was greater than 0.05.

Similarly, there was no significant correlation between Dystrophy and readmission. The correlation coefficient was 0.150, close to 0, and the *p*-value was also greater than 0.05.

On the other hand, there was a significant correlation between Flap and vascular crisis and readmission. The correlation coefficient was 0.706, suggesting a positive correlation between Flap and vascular crisis and readmission (**Table 6**).

Discussion

Despite the implementation of standardized treatment and adherence to guidelines, oral cancer patients may still experience unplanned readmissions due to unforeseen factors. Unplanned readmissions not only prolong the treatment duration and increase costs for patients but also result in the inefficient utilization of medical resources [16, 17]. Currently, there is a lack of accurate predictive methods for unplanned readmissions and postoperative complications in oral cancer patients. In this context, our research team became interested in the Rothman Index, which has demonstrated its effectiveness in predicting outcome differences among hospitalized patients after discharge. Consequently, our focus centered on exploring the predictive role of the Rothman Index in unplanned readmissions following discharge in oral cancer patients [18].

The study included 125 oral cancer patients, among whom 13 experienced unplanned readmissions within 90 days of discharge. The univariate and multivariate analysis results clearly indicated significant differences ($P < 0.001$) in factors such as age, smoking history, alcohol consumption history, and the Rothman Index. Hence, these factors were considered independent influencing factors for unplanned readmissions within 90 days. Advanced age is often associated with poorer physical conditions, resulting in reduced tolerability of radiotherapy, chemotherapy, and extensive surgical procedures. As the elderly experience a decline in their overall physical capacity and weakening immune system, postoperative recovery and regulation become more challenging, making them more susceptible to complications such as infections and metabolic abnormalities [19, 20].

The Rothman Index comprises three components: vital signs, laboratory tests, and nursing assessments. These components collectively offer insights into a patient's physical condition from different perspectives. Vital signs and laboratory tests provide real-time and objective information about the patient's physical health, while nursing assessments encompass a more comprehensive evaluation of the patient's immediate condition. Combining these multiple parameters with clinical evaluations enables a

Table 4. Results of the optimal threshold in the ROC analysis

	AUC	Optimum cut-off value	Sensitivity	Specificity	Cut-off
Rothman index	0.930	0.875	0.863	0.822	0.2884
Pathological type	0.667	0.518	0.875	0.643	0.489
Therapy method	0.359	0.152	0.938	0.214	0.446
Family members accompany	0.768	0.384	0.813	0.571	0.411

Table 5. Complication rates between the readmission and non-readmission groups

Complication	Incidence of unplanned readmissions (%)	Incidence of non-readmission group (%)	*p*
Dysfunction of speech, chewing and swallowing	52	16	< 0.001
Dystrophy	69	45	0.012
Flap and vascular crisis	56	12	0.023

Table 6. Correlation analysis between complications and readmission status

		Dysfunction of speech, chewing and swallowing	Dystrophy	Flap and vascular crisis
Secondary hospital admission	correlation coefficient	0.288	0.150	0.706
	p	0.233	0.541	0.017
	sample size	19	19	19

more accurate and timely assessment of a patient's overall physical condition at the time of discharge. Consequently, it effectively predicts the risk of readmission [21, 22].

Previous studies have successfully utilized the Rothman Index to predict unplanned readmissions in various disease types. These studies found that Rothman Index accurately identified individuals at high risk of unplanned readmission, offering a simple and effective tool for healthcare professionals [23, 24]. Furthermore, the Rothman Index is characterized by its simplicity, ease of calculation, and interpretability, making it more convenient to use and assisting healthcare professionals in formulating reasonable preventive measures [25].

Subsequently, we conducted an analysis of common complications in oral cancer patients, specifically, symptoms such as speech impairment, impaired chewing and swallowing functions, malnutrition, and flap vascular crisis. Patients undergoing local radiotherapy often experience a range of oral complications, including taste changes, difficulty swallowing, and radiation-induced osteonecrosis of the jaw. Addressing these complications involves improving the precision of radiotherapy to minimize damage to surrounding normal tissues and implementing timely targeted nursing interventions, such as fluid replacement after radiotherapy [26]. In cases where significant symptoms arise, novel treatment options like photobiomodulation therapy can be considered to exert anti-inflammatory and analgesic effects. Collaboration with departments specializing in rehabilitative surgery and the active adoption of clinical models, such as enhanced recovery after surgery, aim to optimize perioperative nursing measures based on evidence-based medicine. This approach promotes patient recovery, reduces the incidence of complications, and improves prognosis.

Overall, the findings of this study establish the Rothman Index as an accurate predictor of the unplanned readmission in oral cancer patients within 90 days after discharge. Rothman Index can be a valuable tool for risk management in clinical settings. However, the study does have certain limitations that may affect the accuracy and applicability of the model. Firstly, the research is confined to a single center with a relatively small number of cases, rendering it susceptible to regional, ethnic, racial, national, and dietary influences that may impact the statistical outcomes. Secondly, being a retrospec-

tive study, the Rothman Index incorporates multiple parameters, and incomplete clinical data for some patients may introduce inconsistency in the collection of certain indicators, potentially affecting the input of the final model. Future research should address these limitations by conducting prospective studies involving multiple centers to enhance the generalizability and reliability of the findings.

Acknowledgements

Shanghai Health Commission clinical special project (No. 201940132).

Disclosure of conflict of interest

None.

Address correspondence to: Yiming Gao, Department of Stomatology, Ruijin Hospital, Shanghai Jiao Tong University School of Medicine, No. 197 Ruijin Second Road, Shanghai 200025, China. Tel: +86-021-64370045; E-mail: gym10458@rjh.com.cn

References

[1] Foley J, Wishart LR, Ward EC, Burns CL, Packer RL, Philpot S, Kenny LM and Stevens M. Exploring the impact of remoteness on people with head and neck cancer: utilisation of a statewide dataset. Aust J Rural Health 2023; 31: 726-743.

[2] Lizán L, Pérez-Carbonell L and Comellas M. Additional value of patient-reported symptom monitoring in cancer care: a systematic review of the literature. Cancers (Basel) 2021; 13: 4615.

[3] Gu X, Zhou W and Han J. Factors affecting the readmission of patients with pancreatic cancer after surgery. Appl Bionics Biomech 2022; 2022: 6106914.

[4] Lorenz FJ, Mahase SS, Miccio J, King TS, Pradhan S and Goyal N. Update on adherence to guidelines for time to initiation of postoperative radiation for head and neck squamous cell carcinoma. Head Neck 2023; 45: 1676-1691.

[5] MacFarling Meure C, Steer B and Porter J. Interrelationships between dietary outcomes, readmission rates and length of stay in hospitalised oncology patients: a scoping review. Nutrients 2023; 15: 400.

[6] Meure CM, Steer B and Porter J. Nutritional intake, hospital readmissions and length of stay in hospitalised oncology patients. Cancers (Basel) 2023; 15: 1488.

[7] Cappellacci F, Luigi Canu G, Piras S, Anedda G and Giorgio Cal P. Fabio Medas, technological innovations in thyroid cancer surgery. Oncologie 2022; 24: 35-50.

[8] Zhang H, Yan J, Ren X, Sheng Y, Wang Z, Liang J, Yan Y, Jia Y, Li Z and Hou J. Nimotuzumab combined with neoadjuvant or induction chemotherapy for head and neck squamous cell carcinoma: a retrospective study. Oncologie 2022; 24: 707-716.

[9] Nyirjesy SC, Zhao S, Judd R, McCrary H, Kuhar HN, Farlow JL, Seim NB, Rocco JW, Kang SY and Haring CT. Hypothyroidism as an independent predictor of 30-day readmission in head and neck cancer patients. Laryngoscope 2023; 133: 2988-2998.

[10] Pinto NM, LuAnn Minich L, Yoo M, Floyd A, Wilkes J, VanDerslice J, Yamauchi M and Nelson R. Influence of geographic access on surgical center readmissions after index congenital heart surgery. J Pediatr 2021; 234: 195-204, e3.

[11] Qiu M, Yang H, Zhou J, Feng Y, Liu X, Zhang Q and Du Z. Short-term safety and cosmetic outcomes of endoscopic direct-to-implant breast reconstruction and simultaneous contralateral breast augmentation for breast cancer: a prospective analysis of 33 patients. World J Surg Oncol 2023; 21: 201.

[12] He FJ, Wang MJ, Yang K, Chen XL, Jin T, Zhu LL and Zhuang W. Effects of preoperative oral nutritional supplements on improving postoperative early enteral feeding intolerance and short-term prognosis for gastric cancer: a prospective, single-center, single-blind, randomized controlled trial. Nutrients 2022; 14: 1472.

[13] Kazim SF, Dicpinigaitis AJ, Bowers CA, Shah S, Couldwell WT, Thommen R, Alvarez-Crespo DJ, Conlon M, Tarawneh OH, Vellek J, Cole KL, Dominguez JF, Mckee RN, Ricks CB, Shin PC, Cole CD and Schmidt MH. Frailty status is a more robust predictor than age of spinal tumor surgery outcomes: a NSQIP analysis of 4,662 patients. Neurospine 2022; 19: 53-62.

[14] Lee C, Forner D, Noel CW, Taylor V, MacKay C, Rigby MH, Corsten M, Trites JR and Taylor SM. Functional and oncologic outcomes of octogenarians undergoing transoral laser microsurgery for laryngeal cancer. OTO Open 2021; 5: 2473974X211046957.

[15] Ninot G, Guerdoux E, Carbonnel F, Faravel K, Ismael L, Leenhardt F, Lognos B, Perrier C, Philibert L, Tronc B and Viala M. Impact of complementary medicines on survival in patients with cancer treated with oral chemotherapy in an oncology hospital in France: exploratory study-impact des thérapies complémentaires sur la survie de patients atteints d'un cancer traités par chimiothérapie orale dans un établissement hospitalier français spécialisé en oncologie: étude exploratoire. Oncologie 2022; 24: 605-612.

[16] Robins A, Dishner E, McDaneld P, Rowan M, Bartek J, Jiang Y, Adachi J and Dailey Garnes NJM. Improving the safety of outpatient parenteral antimicrobial therapy for patients with solid tumors. Support Care Cancer 2022; 30: 1643-1654.

[17] Shah M, Douglas J, Carey R, Daftari M, Smink T, Paisley A, Cannady S, Newman J and Rajasekaran K. Reducing ER visits and readmissions after head and neck surgery through a phone-based quality improvement program. Ann Otol Rhinol Laryngol 2021; 130: 24-31.

[18] Sindayigaya R, Tribillon E, Ghedira A, Beaussier M, Sarran A, Tubbax C, Bonnet S, Gayet B, Soubrane O and Fuks D. Predictors of discharge timing and unplanned readmission after laparoscopic liver resection. HPB (Oxford) 2022; 24: 708-716.

[19] Sykes R, Mohamed MO, Kwok CS, Mamas MA and Berry C. Percutaneous coronary intervention and 30-day unplanned readmission with chest pain in the United States (Nationwide Readmissions Database). Clin Cardiol 2021; 44: 291-306.

[20] Tennison JM, Rianon NJ, Manzano JG, Munsell MF, George MC and Bruera E. Thirty-day hospital readmission rate, reasons, and risk factors after acute inpatient cancer rehabilitation. Cancer Med 2021; 10: 6199-6206.

[21] Tucker J, Hollenbeak CS and Goyal N. Discharge destination and readmissions among patients with head and neck cancer. Laryngoscope Investig Otolaryngol 2022; 7: 1407-1429.

[22] Wyse R, Smith S, Zucca A, Fakes K, Mansfield E, Johnston SA, Robinson S, Oldmeadow C, Reeves P, Carey ML, Norton G and Sanson-Fisher RW. Effectiveness and cost-effectiveness of a digital health intervention to support patients with colorectal cancer prepare for and recover from surgery: study protocol of the RecoverEsupport randomised controlled trial. BMJ Open 2023; 13: e067150.

[23] Xu Y, Chen X, Ren J, Zhu M, Li R, Huang J, Yao Y, Zhang Z and Tan Q. Analysis for discharge within 2 days after thoracoscopic anatomic lung cancer surgery. Cancer Med 2023; 12: 13054-13062.

[24] Yang S, Adams W and Bier-Laning C. Head and neck cancer readmission reduction (HANCARRE) project: reducing 30-day readmissions. World J Otorhinolaryngol Head Neck Surg 2022; 8: 158-166.

[25] Zhang W, Zhu H, Ye P and Wu M. Unplanned reoperation after radical surgery for oral cancer: an analysis of risk factors and outcomes. BMC Oral Health 2022; 22: 204.

[26] Zhang Y, Tao K, Yu J, Chen C, Zheng Q, Lei S, Zhong X, Liu L, Wang W, Wang Q, Li E, Luo Y, Zhang G, Feng X, Li Y and Wang J. Evaluation of early liquid drinking after radical gastrectomy in gastric cancer: a Chinese multicenter propensity score matching analysis. Gastroenterol Rep (Oxf) 2023; 11: goad029.