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Unravelling the barriers to surveillance Colonoscopy in rural Australia: A Comprehensive Retrospective analysis

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Abstract

Introduction: This study aims to explore the multifaceted causes of delay in surveillance colonoscopy within a rural endoscopy centre in New South Wales (NSW), with a particular focus on the crucial need for adherence to surveillance guidelines within the prescribed time frames.

Methods: A retrospective observational study was conducted, comprising a thorough analysis of hospital records for all patients who were scheduled for surveillance colonoscopy from March 2019 to March 2023. This dataset encompassed a total of 2043 patients.

Main outcome: Of the 2043 patients, 77 experienced a delayed surveillance colonoscopy. An examination of various factors contributing to this delay revealed no statistically significant effects relating to gender, age, or family history in terms of compliance.

Results: The analysis determined a statistically significant impact of the index diagnosis on the delay ($p = 0.049$), with non-malignant polyps accounting for the longest mean delay (Mean = 15.95, Standard Deviation = 9.90). Primary causes of delay were attributed to the COVID-19 pandemic (35%) and logistical challenges (23%).

Conclusion: This investigation illuminates specific factors influencing delays in surveillance colonoscopy, with particular emphasis on index diagnosis and exogenous factors such as the pandemic. The insights garnered from this study can serve as an essential resource for healthcare providers, enabling them to devise strategies that facilitate timelier adherence to surveillance colonoscopy guidelines. Such interventions could substantially enhance patient care in rural healthcare environments.

Keywords: Surveillance colonoscopy, Colorectal cancer, Rural Australia.

Introduction

Colorectal cancer is the second most common malignancy in women and the third most common malignancy in men, and the fourth leading cause of cancer death worldwide [1]. Early diagnosis and management are crucial for patients with colorectal cancer; it is estimated that the 5-year survival rate of a locally confined, early-stage cancer is as high as 91.1% [2].

Colorectal cancer (CRC) screening has been proved to reduce CRC incidence and mortality not only through the detection of early-stage colonic cancers but also through the detection and removal of pre-neoplastic polyps. The most commonly used modality for CRC screening is colonoscopy [3].

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It is estimated that around 900,000 colonoscopies are performed in Australia each year [4] Colonoscopies are subsidised by the Australian government's universal health care insurance scheme "Medicare" and take place in public and private hospitals [5].

Surveillance after colorectal cancer (CRC) surgery is important for allowing the early detection of recurrence and consequent timely intervention, which may contribute to improving the prognosis of these patients [6]. Surveillance of colorectal neoplasia is based on the premise of the adenocarcinoma sequence, in which the accumulation of well-characterised genetic changes over time can lead to dysplasia and neoplasia. Surveillance seeks to detect precursor lesions during this interval. Studies have long shown that colonoscopy is a cost-effective method of surveillance [7]. It offers the advantage of assessing the entire colon with the possibility of simultaneous biopsy or polypectomy, allowing for the detection and treatment of neoplastic precursor lesions and cancers at an early stage of evolution [7].

According to the Australian Institute of Health and Welfare in 2016, colorectal cancer was both the second most common cancer and the second most common cause of cancer-related deaths [5]. An inequality of colorectal cancer survival with significant geographical variation has been recognised as a problem in Australia and a number of studies have indicated that colorectal cancer survival estimates are lower for patients diagnosed outside of major cities [8].

Patients who live in regional and rural areas are diagnosed later and have poorer outcomes compared to their metropolitan counterparts [9]. Regional and rural Australians have a well-documented disparity of health outcomes with a poorer life expectancy and lower access to general practitioners and medical specialists. In terms of colorectal cancer, regional and rural Australians are found to present in the later stages of colorectal cancer and have poorer five-year survival rates when compared to their metropolitan counterparts [9]. Multiple factors have been attributed to this disparity between regional and metropolitan areas including limited access to health practitioners, socioeconomic status and private insurance status.

There are significant shortages of endoscopists in rural and remote areas of Australia. Reasons for this discrepancy include the lack of skilled practitioners in rural communities and travel time for patients to attend larger centres when the required bowel preparation or mobility issues limit access [9,10].

In this study, the main goal is to assess compliance with recommended surveillance guidelines in a single regional centre in Australia and qualitative analysis of the causation of noncompliance with those guidelines.

Methodology

In this retrospective observational study, we examined the influence of index diagnosis and various delay causes on surveillance colonoscopy in a rural endoscopy centre. Data were retrieved from the electronic medical records (EMRs) of patients scheduled for surveillance colonoscopy between March 2019 and March 2023. The recommendation for admission forms (RFAs) was the primary source for identifying eligible patients and understanding the corresponding indications.

Additional data on index diagnosis, demographic characteristics, family history of polyps and colorectal cancer, and intervening gastrointestinal procedures were collected from the EMRs and endoscopy reports. The study included patients who underwent surveillance colonoscopy beyond the recommended interval by six months. Patients who had an intervening colonoscopy in private hospitals were excluded.

The primary endpoint was the mean delay in months for surveillance colonoscopy across various index diagnosis subcategories. The goal was to discern the impact of the original diagnosis on adherence to the recommended surveillance intervals. Secondary endpoints included the effects of age, gender, family history, and interval surgical procedures on compliance.

The reasons for the delay were collected directly from the patients, which provided insights into the factors influencing the delay in surveillance colonoscopy among the study's patient population.

Statistical analysis

The descriptive statistics were utilised initially to examine the distribution of age, gender, and diagnostic categories within the data. Moreover, we identified and categorically analysed various reasons for the delay in surveillance colonoscopy.

The influence of primary diagnosis on the delay was measured through a one-way Analysis of Variance (ANOVA), allowing us to ascertain the variation in delay times across different diagnostic categories. Independent t-tests further determined any significant association between factors (e.g., age, gender, family history) and the interval delay.

When the data violated the assumptions of ANOVA, we employed the non-parametric Kruskal-Wallis H test. This allowed us to discern if statistically significant differences existed in delay times across the various identified delay causes.

All statistical analyses were carried out using the JAMOVI software package. A p-value of less than 0.05 was set as statistical significance.

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Results

77 patients out of total 2043 who were involved in our study did not comply with the recommended surveillance colonoscopy interval within the specified timeframe. Of this cohort, 61% were male, and the mean age was approximately 65 years. The patient characteristics are detailed in Table 1. The primary reason for surveillance colonoscopy was a personal history of polyps (56%), followed by a history of colorectal cancer (38%). The leading causes of delay were related to the coronavirus disease 2019 (COVID-19) global pandemic (35%) and logistical issues (23%). Table 2 provides a summary of the analysis of different variables.

Notably, a higher percentage of males were deterred from undergoing surveillance due to bowel preparation concerns (9% vs 4%). However, there were no statistically significant effects of gender, age, or family history on compliance with the procedure.

The impact of various index diagnoses on mean delay was investigated using ANOVA, which revealed a significant effect of the index diagnosis on delay ($p = 0.049$). Post-hoc comparisons, adjusted using Bonferroni correction, found no significant differences between invasive colorectal cancer index diagnoses and malignant polyps ($p = 1.000$). However, patients with a history of non-malignant polyps experienced a longer average delay (Mean = 15.95, SD = 9.90) compared to others (Table 3).

Table 1: Population Characteristics and Variables

Characteristic	N (% or IQR)
Patient population (delay in surveillance>6 months of recommended interval)	77
Mean Age (in years)	64.97(40-89)
Gender	
- Male (%)	47(61%)
- Female (%)	30(39%)
Index/Primary Diagnosis	
- History of Polyps	43 (56%)
- Personal History of Colorectal Cancer	29 (38%)
-Non-invasive malignant polyps	5 (6%)
Family history of polyps	42(55%)
	M=25
	F=17
Family history of colorectal cancer	32(42%)
	M=21
	F=11
Personal history of unrelated gastrointestinal procedures	23(30%)
	M=16
	F=7

Table 2: Association between demographic and clinical characteristics with delay in surveillance colonoscopy.

Colorectal cancer	**29**	**11.59**	**6.03**
Malignant polyps	5	9.4	2.3
Non-malignant polyps	43	15.95	9.9
	Variables	**Coefficient / Statistic**	**P-value**
	Gender (Male vs Female)	Student's t-test	0.07
	Index Diagnosis	One way ANOVA	0.049
	Family History of Cancer	Student's t-test	0.703
	Family History of Polyps	Student's t-test	0.476
	GI Procedures	Student's t-test	0.399

* P value=.05 as statistically significant

Table 3: Correlation of Index diagnosis and delay in surveillance colonoscopy.

Index Diagnosis	N	Mean delay (months)	SD
Colorectal cancer	29	11.59	6.03
Malignant polyps	5	9.4	2.3
Non-malignant polyps	43	15.95	9.9
Family History of Polyps	Student's t-test		0.476
GI Procedures	Student's t-test		0.399

* P value=.05 as statistically significant

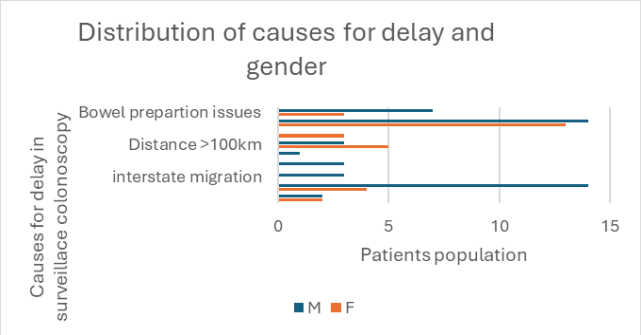

Figure 1: Causes for the delay in surveillance colonoscopy.

Discussion

Based on the data collected between 2019 and 2023, it is clear that there are factors affecting adherence to the recommended guidelines for surveillance colonoscopy.

The coronavirus disease 2019 (COVID-19) global pandemic was the major leading cause for the delay in our findings (35%) followed by the delay secondary to logistical issues (23%). Moreover, poor bowel preparation is one of

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the causes of the delay in surveillance colonoscopy, and the data showed that this factor is more predominant in males compared to female patients. However, there were no statistically significant effects of gender, age, or family history on compliance with the procedure.

The global pandemic of the coronavirus disease 2019 (COVID-19) has affected elective procedures, including colonoscopies, worldwide. Limited colonoscopy capacity, as well as patient reluctance to attend the hospital, may lead to colonoscopies being delayed. According to Wassie et al., the number of surveillance colonoscopies that were due but had not been completed within three months of the due date increased from 52.9% (162/306) in 2019 to 68.0% (198/291) in 2020. Additionally, the number of surveillance colonoscopies that had not been completed within six months of the due date increased from 19.3% (59/306) in 2019 to 46.1% (134/291) in 2020 [11].

Another factor that impacted compliance with the surveillance colonoscopy was the logistical issues which might include limited access to medical practitioners in the rural and remote areas, travel time and private insurance status.

Previous experience with the bowel preparation also contributed to the delay in surveillance colonoscopy. Poor bowel preparation could result from inadequate patient education and counselling. Available literature has demonstrated that patients may need better understanding of bowel preparation based on the use of conventional methods of education, oral and written instructions. These patient resources may need further improvement, as one of the studies carried out by Gen Ga et al. has shown that patients who received virtual reality video education before colonoscopy had better bowel preparation, higher polyp and adenoma detection rates, and improved compliance and satisfaction compared to those who received the conventional method of education only [12].

Travel time was found to influence poor bowel preparation, which in turns impact the timing of surveillance colonoscopy, as the literature showed that increasing driving distance to screening colonoscopy was negatively associated with adequate bowel preparation [13].

It is also noticeable that the delay among patients with non-malignant polyps was greater than that among those with colorectal cancer or malignant polyps (15.95 months compared to 11.59 and 9.40 months, respectively). Patients with non-malignant polyps might be comforted by the fact that their condition is not malignant, and consequently, they might not be aware of the potential consequences. Hence, they are often less compliant compared to patients with colorectal cancer or malignant polyps.

The National Bowel Cancer Screening Program is gradually gaining traction as public awareness of the importance of screening and early detection of bowel cancer and polyps grows. This, in turn, will likely increase the demand for colonoscopy services.

Our recommendations include establishing new strategies and policies to improve patient education methods and examining other aspects to enhance compliance with surveillance colonoscopy. For instance, encouraging travel reimbursement could minimise costs for patients and aid in adherence to recommended guidelines. Another vital recommendation is to increase awareness about the importance of surveillance colonoscopy among individuals with non-malignant polyps. We also advocate for further studies in this field to enhance healthcare services in rural and remote areas.

Conclusion

This is probably the first study carried out in rural Australia which illuminates specific factors influencing delays in surveillance colonoscopy. The insights garnered from this study can serve as an essential resource for healthcare providers, enabling them to devise strategies that facilitate timelier adherence to surveillance colonoscopy guidelines.

Acknowledgements statement

None

Data availability

The data used to support the findings of the study are available upon request to the corresponding author.

Conflicts of interest

None declared.

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