



ORIGINAL ARTICLE

Impact of institutionalization and anticholinergic medication on postoperative morbidity for major colorectal resections



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KEYWORDS

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Summary *Background:* Institutionalized patients pose various surgical difficulties as many have conditions requiring psychiatric medications with the propensity for anticholinergic side effects. This study was initiated to determine the impact of institutionalization and anticholinergic medication on postoperative outcomes.

Methods: A total of 430 colorectal resection cases from 2006 to 2012 were studied. Among them, 19 were institutionalized patients and 17 were on long-term anticholinergic medications. Surgical outcomes were quantified by Clavien scoring, need for reoperations and postoperative deaths.

Results: Patients who were institutionalized or on anticholinergic medication were more likely to have increased postoperative morbidity requiring invasive interventions or worse (Clavien score ≥ 3 ; odds ratios 5.02 and 3.63, 95% confidence intervals 1.93–13.06 and 1.29–10.21 respectively). However, only institutionalization was found to be an independent risk factor.

Conclusion: This study identified institutionalized patients as a higher risk group associated with postoperative complications compared to patients from the community. Thus, they merit a more thorough preoperative optimization closer postoperative monitoring regime.

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1. Introduction

Institutionalization refers to the confinement of a person to a facility offering specialized care for social, medical, or psychiatric conditions. In the local setting, this includes individuals committed to a psychiatric facility, a nursing home for the elderly and infirmed, or a community hospital

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for rehabilitation over a long period. It was noted that many institutionalized individuals with psychiatric conditions were treated with medications that possess anticholinergic side effects—antipsychotics and tricyclic antidepressants—and thus it was hypothesized that the treatment modality could play a role in the development of postoperative complications. The anticholinergic effects of such medications could lead to decreased gut motility, increased duration of postoperative ileus or even causing paralytic ileus.¹ Studies have demonstrated an increased in the rate of water intoxication² and postoperative mortality^{2,3} for patients on chronic antipsychotic medications.

However, there is limited literature available associating institutionalization and anticholinergic medication on postoperative morbidity and outcomes. This study was initiated to examine this issue in depth on patients who had undergone major colorectal resections in the Alexandra Health System (AHS) in Singapore. AHS presented an ideal setting for this study as it is the major referral center for patients from the Institute of Mental Health, a public psychiatric institution. AHS also has a significant number of nursing home referrals as they are within its catchment area.

2. Methods

All patients who had undergone major colorectal resections in AHS between December 2006 and November 2012 were reviewed. Among the 430 patients, 19 were institutionalized cases, 17 patients were on anticholinergic medication for psychiatric conditions and 10 patients fell into both categories. Data from our prospectively collected computer database were extracted and further clinical information was extracted from a review of the clinical notes. Individual comorbidities were recorded and quantified using the American Society of Anesthesiologist (ASA) system. Stage of malignant disease and urgency of operations performed were noted. Outcome measures of morbidity were quantified with the Clavien scoring system⁴ and this also included the need for reoperations and postoperative mortality. Analysis for factors correlating to the development of postoperative complications and mortality were performed using factors that were identified to be useful predictors by previous studies.

Bivariate analysis was performed using χ^2 test in SPSS for Windows (SPSS Inc., Chicago, IL, USA), version 20.0 on a

personal computer. Results were expressed as odds ratios with 95% confidence intervals. Stepwise logistic regression analysis was used in multivariate analysis to identify parameters that independently had affected outcomes.

3. Results

The demographic and characteristics of institutionalized patients and those on anticholinergic medication are shown in Table 1. There was no statistically significant difference between institutionalized patients and those from the community in terms of age, sex, location of disease, stage of malignancy, urgency of operation, or ASA score. Patients who were on anticholinergic medication did not statistically differ from those who were not.

Bivariate analysis showed that institutionalization and being on anticholinergic medication had increased risk of postoperative morbidity. The odds ratio for developing Clavien 3 complications and above was 5.02 [95% confidence interval (CI) 1.93–13.06] for institutionalized patients and 3.63 (95% CI 1.29–10.21) for those on anticholinergic medication (Table 2). The odds ratio for developing Clavien 2 complications and above was 3.43 (95% CI 1.28–9.22) for institutionalized patients and 2.87 (95% CI 1.04–7.91) for those on anticholinergic medication. Institutionalized patients were also found to have increased risk for reoperations (odds ratio 3.51, 95% CI 1.10–11.27). Notably, there was no statistically significant difference in the rate of hospitalization deaths for either group of patients.

Multivariate analysis revealed institutionalization, urgency of operation, and ASA score to be independent predictors of morbidity (Clavien score ≥ 3 ; Table 3). Being on anticholinergic medication was not shown to be an independent predictor of morbidity.

4. Discussion

Our study revealed both institutionalization and being on anticholinergic medication to be associated with an increased risk of postoperative complications, but only institutionalization was shown to be an independent predictor of increased morbidity.

While there is limited literature available on the postoperative outcomes of the institutionalized patients, a study reported that institutionalized patients who

Table 1 Patient demographics and operation characteristics.

Variable	Institutionalized			Anticholinergic medication		
	Yes	No	<i>p</i>	Yes	No	<i>p</i>
Age (y), mean (SD)	70.0 (12.30)	65.2 (12.65)	0.447	65.47 (11.65)	65.41 (12.71)	0.836
Male sex	47 (9/19)	57 (235/411)	0.399	53 (9/17)	57 (235/413)	0.747
Emergency operation	42 (8/19)	28 (116/411)	0.192	35 (6/17)	29 (118/413)	0.549
Rectal operation	37 (7/19)	43 (176/411)	0.606	29 (5/17)	43 (178/413)	0.263
Stage 3 disease and above	79 (11/14)	57 (197/344)	0.113	75.0 (12/16)	57.3 (196/342)	0.161
ASA Score 3 and above	53 (10/19)	33 (135/411)	0.075	53 (9/17)	33 (136/413)	0.087

Data are presented as % (n/N) unless otherwise indicated.

ASA = American Society of Anesthesiologist; SD = standard deviation.

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