PRISMA Analysis of 30 Day Readmissions to a Tertiary Cancer Hospital

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Abstract

Background: *Hospital readmissions are increasingly used as a quality indicator. Patients with cancer have an increased risk of readmission.*

The purpose of this study was to develop an in depth understanding of the causes of readmissions in patients undergoing cancer treatment using PRISMA methodology and was subsequently used to identify any potentially preventable causes of readmission in this cohort.

Methods: *50 consecutive 30 day readmissions from the 1st November 2014 to the medical admissions unit (MAU) at a specialist tertiary cancer hospital in the Northwest of England were analysed retrospectively.*

Results: *25(50%) of the patients were male with a median age of 59 years (range 19-81). PRISMA analysis showed that active (human) factors contributed to the readmission of 4 (8%) of the readmissions, which may have been potentially preventable. All of the readmissions were driven by a medical condition related to the patient's underlying cancer and ongoing cancer treatment.*

Conclusion: *The majority of readmissions of patients undergoing cancer treatment appear to be related to the underlying condition and, as such, are predictable but not preventable. This suggests that hospital readmission is not a good quality indicator in this cohort of patients.*

Keywords

Readmissions, Cancer, PRISMA, Rehospitalisations, AMU.

Key Points

- Readmissions in patients undergoing cancer treatment appear to be related to the underlying condition and, as such, are predictable but rarely preventable.
- Hospital readmission is not a reliable quality indicator in this cohort of patients.

Background

Hospital readmissions are increasingly being used as a quality indicator for Acute Medical Units (AMUs). This has led to a drive to identify and reduce avoidable readmissions to lessen the financial burden on hospitals and improve the quality of care.

The number of patients with cancer is increasing. With an ageing population and improved outcomes following treatment, it is estimated that by 2020 the incidence of cancer will have increased by 33% with a significantly increased prevalence.[1-3] Patients with cancer comprise approximately 15% of all acute medical admissions[3,4] and have an increased risk of readmission.[5,6]

The purpose of this study was to develop an in depth understanding of the causes of readmissions in patients undergoing cancer treatment using PRISMA methodology and was subsequently used to identify any potentially preventable causes of readmission in this cohort.

Methods

50 consecutive 30 day readmissions from the 1st November 2014 to the AMU at a specialist tertiary cancer hospital in the Northwest of England were analysed retrospectively. Patients admitted to the AMU are 16 years +, undergoing active cancer treatment and are admitted via specialist clinics, treatment centres or self-referral via a specialist nurse-led telephone hotline. Patients readmitted for elective chemotherapy or radiotherapy were excluded. The AMU does not admit surgical patients. The baseline data collected included:-

- Basic patient demographics
- Cancer type
- Reason for index admission and subsequent readmission
- HOSPITAL score[5] – a prediction tool to identify patients at high risk of 30 day readmission.
- Clinical frailty scale[7]
- Modified Early warning score[8] (MEWS) on discharge – a marker of physiological stability.
- Time to clinic follow up

PRISMA analysis was performed on each readmission through case-note review to determine

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all causal factors of the readmission and classify them as technical, organisational, active (human healthcare provider) or patient-related. PRISMA is a tool to analyse the root causes of unintended events and a taxonomy to classify these has been accepted by the World Alliance for Patient Safety of the World Health Organisation.[9,10] Table 1 outlines the categories of the PRISMA analysis. Simple descriptive statistics were used to analyze the sample.

Results

Of the 50 patients readmitted 25(50%) were male and the median age was 59 years (19-81 years). 49 (98%) of the patients were readmitted from their own home with 1 (2%) from a hospice. Table 2 shows the baseline characteristics of the patients.

The mean time to readmission was 9.64 days (1-27 days). All of the readmissions were medical in nature and related to the patient's malignancy or treatment. PRISMA analysis demonstrated that 4 (8%) of the readmissions had active (human) related elements. The human factor related readmissions were:-

HRV – Patient readmitted with vomiting 36 hours post discharge following an admission with neutropenic fever and felt not to be fully recovered from initial episode.

HRV – Patient with metastatic colorectal carcinoma readmitted with vomiting and abdominal pain 48 hours post discharge following a similar initial admission and felt not to be fully recovered from initial episode.

HKK – Patient readmitted with electrolyte disturbances secondary to type 2 renal tubular acidosis (RTA) related to ifosfamide treatment. He was initially admitted with cellulitis but notes review revealed electrolyte disturbances consistent with the type 2 RTA following his initial ifosfamide treatment.

H-ex – Patient readmitted following displacement of an NG tube in the community

Table 2. Baseline characteristics of the patients. Values shown are mean (range)

Age (years)	55.62 (19-81)
Sex - Male	25 (50%)
Cancer type	
Haematological	13
Head and neck	10
Gastrointestinal	8
Gynaecological	6
Lung	4
Sarcoma	3
HPB	3
Melanoma	2
Cancer of unknown primary	1
Time to readmission (days)	9.64 (1-27)
HOSPITAL score	7.22 (5-12)
MEWS score on discharge	0.64 (0-2)
Clinical frailty score on discharge	4.18 (3-6)

Table 1. Description of categories of the Eindhoven classification model: PRISMA-medical version.[9,10]

Main category	Subcategory	Code	Description
Technical	External	T-ex	Technical failures beyond the control of the organization.
	Design	TD	Failures to poor design of equipment etc.
	Construction	TC	Correct design inappropriately constructed or placed.
	Materials	TM	Material defects not classified under TD or TC.
Organisational	External	O-ex	Failures at an organisational level beyond the control and responsibility of the investigating team.
	Transfer of knowledge	OK	Failure resulting from inadequate measures to train or supervise new or inexperienced staff.
	Protocols	OP	Failures relating to the quality or availability of appropriate protocols.
	Management priorities	OM	Internal management decisions which reduce focus on patient safety when faced with conflicting priorities.
	Culture	OC	Failure due to attitude and approach of the treating organisation.
Human	External	H-ex	Human failures beyond the control of the organisation/department.
	Knowledge-based behaviour	HKK	Failure of an individual to apply their knowledge to a new clinical situation.
	Qualifications	HRQ	An inappropriately trained individual performing the clinical task.
	Co-ordination	HRC	A lack of task co-ordination within the healthcare team.
	Verification	HRV	Failure to correctly check and assess the situation before performing interventions.
	Intervention	HRI	Failure resulting from faulty task planning or performance.
	Monitoring	HRM	Failure to monitor the patient's progress or condition.
	Skills-based	HSS	Failure in performance of highly developed skills.
Patient-related	Patient-related	PRF	Failures related to patient characteristics or conditions, which are beyond the control of staff and influence clinical progress.
Other	Unclassifiable	X	Failure that cannot be classified in another category.

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which was being used for nutritional support as a result of oral mucositis.

Each of the human factors contributing to the readmission were felt to be potentially preventable. No technical or organizational factors were identified. All of the readmissions had patient-related factors. These related to recognized toxicities of treatment, new infective conditions or disease progression and were not felt to be avoidable.

The mean MEWS of the patients at initial discharge was 0.64 (range 0-2) reflecting physiological stability supporting the decision. The mean HOSPITAL score was 7.22 (range 5-12) illustrating that this was a cohort recognised to be at high risk of readmission.

Furthermore, 28 (56%) of the patients had attended a Consultant clinic between their index admission and subsequent readmission. All of the patients had senior clinician contact prior to readmission and every patient has access to 24 hour telephone advice line operated by specialist nurses.

Discussion

This PRISMA analysis aims to describe the causal factors of hospital readmission in patients undergoing active cancer treatments. Given the increasing burden of cancer, improving treatment modalities, the adverse effects associated with readmission and the financial penalties levied it is essential to identify preventable causes of readmission in this cohort.

All of the readmissions were driven by a medical condition related to the patient's underlying cancer. These were usually related to recognized treatment toxicities, new infective conditions or disease progression. Only 4 (8%) readmissions were felt to be potentially preventable.

Technical and organizational causes are difficult to ascertain from retrospective notes reviews. Subsequent work should include interviews with health care professionals and patients to help elucidate these and additional human factors.

Hospital readmissions are a complex phenomenon with a wide range of contributing factors. Many interventions and innovations have been studied with the aim of reducing readmissions with varying results. Integrated care interventions have demonstrated some benefit in patients with heart failure, COPD and frail elderly patients.[11-14]

There have not been any studies demonstrating an intervention that reduces readmissions in patients undergoing cancer treatments. A large retrospective review of medical and surgical cancer readmissions demonstrated that a minority of patients had a potentially preventable cause and that most risk factors for readmission in this cohort were not modifiable.[6]

Follow up telephone consultations may have an effect on preventing avoidable hospital readmissions.[15,16] The 24 hour a day advice hotline operated at our centre may have had an impact in preventing unnecessary readmissions.

Hospital readmissions may act as a rescue with the decision to readmit reflecting sound clinical judgement rather than poor care.[6,17] This scenario is particularly likely in high risk populations. Furthermore, it could be argued that high quality care of these patients is facilitating improved outcomes and enabling patients to undergo further intensive cancer therapies resulting in higher levels of readmission.

Readmission risk remains difficult to define and is less predictable than mortality.[18] Acute medical units treat and discharge a number of high risk patients, such as those with cancer and heart failure. The use of readmission rates as a quality indicator relies on the premise that these are preventable and reflect poor care, which is a contentious concept.[6] It is possible that overall readmission rate is not a good marker of AMU performance and that the exclusion of certain groups of patients, including those undergoing treatment for cancer, may allow this to become a better quality indicator.

Conflict of interest

Nothing to declare

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References

1. Balducci L, Ershler WB. Cancer and ageing: a nexus at several levels. *Nat Rev Cancer* 2005; **5**: 655–62.
2. Moller H, Fairley L, Coupland V, *et al.* The future burden of cancer in England: incidence and numbers of patients in 2020. *Br J Cancer* 2007; **96**: 1484–88.
3. Berger J, Cooksley T, Holland M. The burden of cancer on the Acute Medical Unit. *Clin Med* 2013; **13**: 457–9.
4. Mansour D, Simcock R, Gilbert D. Acute Oncology Service: Assessing the Need and its Implications. *Clin Oncol* 2011; **23**: 168–73.
5. Donze J, Aujesky D, Williams D, *et al*. Potentially avoidable 30-day hospital readmissions in medical patients. *JAMA Intern Med* 2013; **173**: 622–8.
6. Brown E, Burgess D, Li C, *et al*. Hospital readmissions: necessary evil or preventable target for quality improvement. *Ann Surg* 2014; **260**: 583–91.
7. Rockwood K, Song X, MacKnight C, *et al*. A global clinical measure of fitness and frailty in elderly people. *CMAJ* 2005; **173(5)**: 489–95.
8. Cooksley T, Kitlowski E, Haji-Michael P. Effectiveness of Modified Early Warning Score in predicting outcomes in oncology patients. *QJM* 2012; **105(11)**: 1083–8.
9. Smits M, Groenewegen P, Timmermans D, *et al*. The nature and causes of unintended events reported at ten emergency departments. *BMC Emerg Med* 2009; **9**:16.
10. World Health Organization Alliance for Patient Safety: Project to develop the international patient safety event taxonomy: updated review of the literature 2003-2005. *Geneva: World Health Organization*; 2005.
11. Naylor M, Brooten D, Campbell R, *et al*. Transitional care of older adults hospitalized with heart failure: a randomized controlled trial. *J Am Geriatr Soc* 2004; **52(7)**: 1228.
12. Woodend A, Sherrard H, Fraser M, *et al*. Telehome monitoring in patients with cardiac disease who are at high risk of readmission. *Heart Lung* 2008; **37(1)**: 36–45.
13. Garcia-Aymerich J, Hernandez C, Alonso A, *et al*. Effects of an integrated care intervention on risk factors of COPD readmission. *Respir Med* 2007; **101(7)**: 1462–9.
14. Golden A, Tewary S, Dang S, *et al*. Care management's challenges and opportunities to reduce the rapid rehospitalisation of frail community dwelling older adults. *Gerontologist* 2010; **50(4)**: 451–8.
15. Soong C, Kurabi B, Wells D, *et al*. Do post discharge phone calls improve care transitions? A cluster-randomized trial. *PloS One* 2014; **9(11)**: e112230.
16. Hansen L, Young R, Hinami K, *et al*. Interventions to reduce 30-day rehospitalisation: a systematic review. *Ann Intern Med* 2011; **155(8)**: 520–8.
17. Kent T, Sachs T, Callery M, *et al*. Readmission after major pancreatic resection: a necessary evil? *J Am Coll Surg* 2011; **213**: 515–23.
18. Kansagara D, Englander H, Salanitro A, *et al*. Risk prediction models for hospital readmission: a systematic review. *JAMA* 2011; **306**: 1688–98.

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