A retrospective comparative study of patients with chest pain and intra-ward transfers

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Abstract

This retrospective, comparative survey examined patients who had a discharge diagnosis of chest pain and were admitted to The St. George Hospital between July 1999 to June 2000.

The aim was to identify the clinical wards/units to which patients were admitted and the number of intra-ward transfers' patients experienced during their hospitalisation. Patients admitted to the cardiology ward/units and outlying wards were compared to determine the number of intra-ward transfers and length of hospital stay. The study found that older patients were more likely to be transferred and that the number of intra-ward transfers impacted upon length of hospital stay.

Outlying wards and length of stay

Evidence suggests that patients treated in outlying wards, or in clinical areas of a differing speciality, have a longer length of stay compared to those patients treated in wards specifically for the disease process or condition (Czaplinski & Diers 1998). This study aimed to identify the location where patients were admitted and treated within a Sydney principal referral hospital following a diagnosis of chest pain (Diagnosis Related Group 261, version 3.0) and whether the number of intra-ward transfers per hospital admission impacted upon length of stay (LOS).

Diagnosis Related Group (DRG) 261

DRG 261 is the classification for patients with a discharge diagnosis of chest pain who have not been documented as ischaemic heart disease. Some patients with chest pain may have been grouped into other DRG(s) if the aetiology was documented (Mackay & Millard 1999). DRG 261 was selected for this study as it was one of the "top 10" DRGs at this hospital and has a slightly longer length of stay compared to the national average.

Average Length of Stay

The national average length of stay (ALOS) for patients coded with DRG 261 (chest pain) treated within a NSW principal referral hospital is 2.03 days. The ALOS for patients coded with chest pain at this hospital for the financial year 1999-2000 was 2.25 days (includes same day admissions) or 2.75 days if day only admissions are excluded.

Literature review

Bed management

Coronary care units aim to provide specialist care and improve patient outcomes. However, the higher staff ratios and technologies utilised in coronary care units (Schultz et al. 1998) are associated with high costs (Stewart & Voss 1997). In order to improve bed efficiency and reduce costs, patients admitted to these units must be clinically appropriate, and remain only during the acute period of the disease (Weingarten et al. 1990; Stewart & Voss 1997; Kelly et al. 1999). A disadvantage of these bed management and clinical practices is that patients are frequently transferred to an area of lower dependency to accommodate a more acute patient.

Patient transfers

Intra-hospital transfers are associated with high resource utilisation, longer lengths of stay and increased morbidity rates (Bernard et al. 1996; Mehta et al. 1999). Less evidence is available regarding the association between the number of intra-ward transfers and LOS. However, evidence suggests that the transfer of patients from the coronary care unit to general wards is associated with cardiac arrhythmias (Jenkins & Rogers 1995) that are likely to impact upon length of stay, while some unexpected deaths could be prevented by longer stays in intensive care (Leith 1999; Southgate, 1999).

Deines and Stevens (1987) cite 349 intra-ward or room transfers in one month while Smith (1976) reports an average of 24 "within-hospital" transfers per day over a three-week period in one large hospital. A high number of patient transfers are associated with coronary and intensive care areas because critical care patients are spending less time in these units due to pressure for beds (Jenkins & Rogers 1995; Southgate 1999). Smith (1976) reports that patients who are "progressing" to an area of lower dependency sometimes spend less than eight hours in an area before being transferred.

Transfer processes, whether intra-hospital or intra-ward, are expensive and frequently require a multi-disciplinary approach. Costs of transfer are often attributed to the provision (time and cost) of nurse escorts (Deines & Stevens 1987; Navarro 1992; Cook, Gardner & Gardner 2000) but in reality includes costs related to the time of clerical staff, other health professionals and manpower services (Smith 1976).

Even if a nurse escort is not required the cost of nurses' time in relation to patient preparation was considered to be high. Patterson et al. (1995) estimated receiving a new patient to take between 5-30 minutes per patient while documentation and administrative preparation for transferring the patient out was estimated to take 10-15 minutes. Deines and Stevens (1987) estimated the time taken for transfers to occur within their organisation to be 45 minutes on average, with the nurse's time being approximately 30 minutes per transfer. Additional costs of patient transfers are linen utilisation, hotel-type services and supplies (Deines & Stevens 1987). Other costs (probably hidden) are those associated with the re-organisation of pharmaceuticals and dietary requirements and the potential costs of errors from poor transfer organisation (Deines & Stevens 1987).

Reasons for transfer

Clinical nurses view the transfer process as an inevitable part of hospitalisation (Smith 1976) in which they generally do not have much input or control. Minimal collaboration occurred between nurses and physicians regarding the transfer decision (Higgins 1999) while transfer communication was perceived by nurses to be poor (Patterson et al. 1995).

Despite their frequency, reasons for intra-ward transfers have not been well studied. Deines & Stevens (1987) state that, of the transfers they studied, 23% were unnecessary. They identified four reasons for "in-house transfers". The most frequent were (77%) due to changes in patient condition, followed by physician-initiated (22%), patient's own request for transfer (14%), and unit requirement (7%) incorporating a need for isolation or closer observation of the patient.

Smith (1976) found that reasons were many and varied but the most common (65.6%) was that of "progression" (transfer due to improvement in patient status) either within the intensive care unit or to a lower dependency area. Southgate (1999) identified a lack of intensive care beds (frequently associated with a shortage of nursing

staff) as a cause of an increase in "bed-space transfers" in Scotland. Interestingly, 37% of patients in the Smith (1976) study either were unaware of the reason for transfer or gave a reason different to that officially recorded.

Effect of transfers on the patient

From patients' perspectives, the transfer process can cause considerable anxiety due to the unfamiliarity and loss of security that a change in environment brings (Deines & Stevens 1987; Jenkins & Rogers 1995; Leith 1999). Anxiety is especially likely if the transfer occurs suddenly (limiting the time allowed for the patient to adjust to the impending disruption) or if the patient is poorly prepared (Jenkins & Rogers 1995). Patients who are transferred from specialised units to general wards can sometimes feel vulnerable without cardiac monitors (Smith 1976) and related technology. Additionally, reduced staffing levels on general wards can be unsettling to patients and family members leading to feelings of neglect (Saarmann 1993; Leith 1999).

Several studies quote patient antipathy regarding transfer from specialised units to wards from fear of reprisal or amnesia regarding the entire inpatient process (Smith 1976; Saarmann 1993; Leith 1999; Odell 2000). Conversely, some patients view the transfer process as a positive step (Smith 1976; Leith 1999; Odell 2000) although this feeling is negated if patients are placed in a room with critically or terminally ill patients (Jenkins & Rogers 1995). Leith (1999) reported that transfer anxiety could be ameliorated if patients were fully informed while Saarmann (1993) emphasised the importance of including family members in transfer preparation. Patient stress, complications and length of stay were all reduced if families were involved. Transfer to an area with which the patient was familiar also helped to alleviate anxiety although this was dependent on the patient having had a previous positive transfer experience (Leith 1999).

Aims of the study

The study had four aims. The first was to determine if patients classified with chest pain (DRG 261) were treated within the designated cardiology ward/units within one hospital. The second was to identify the number of intra-ward transfers experienced by patients with chest pain. The third was to determine whether more intra-ward transfers a patient experienced were associated with an increased LOS. Finally, we wished to compare LOS for chest pain patients treated within cardiology areas with those treated on outlying wards.

Method

Design

A retrospective study was performed of patients admitted between 1 July 1999 and 30 June 2000 and classified as DRG 261 at The St. George Hospital. Admission status, clinical area of admission and number of transfers during this hospitalisation were examined.

Sample

A total of 450 patients were categorised as chest pain (DRG 261) during the study period. The sample consisted of 223 males and 227 females with an age range from 16-99 years (mean 62). Average length of stay was 2.25 days. Females were significantly older (p=<0.007) and had a longer ALOS (refer to Figure 1).

Figure 1: Patient numbers by sex & age for patients admitted with chest pain (DRG 261)

	Number	Mean Age	Age Range	ALOS (days)
Males	223	59.8	16-99	2.0
Females	227	64.1	19-94	2.48
Total	**450**	**62**		**2.25**

The majority (97.1%, n=437) of patients were admitted via the emergency department (ED) with only 2.9% (n=13) of patients classified as direct admissions. Fifty-seven percent (n=250) of the emergency admissions were transferred to another clinical area while 41.6% (n=187) were discharged home from the ED.

Area of admission

Sixty percent of patients were (at some point in their hospitalisation) accommodated within the Division of Medicine but patients were also accommodated within several other divisions of the hospital, such as the Division of Surgery (4.4%). Patients were admitted to eight different wards within the hospital (excluding the ED) but were discharged from 21 different wards.

International Classification of Diseases version 10 (ICD-10)

Principal diagnoses (ICD-10) were examined. The majority (n=402) of patients were categorised as "chest pain, unspecified" (ICD-10, RO7.4) as documentation did not identify the cause of chest pain. Forty-seven of the patients were classified "other chest pain" (ICD-10, RO7.3) which includes anterior chest wall pain with no other symptoms while one patient had pre-cordial pain (ICD-10, RO7.2).

Results

Intra-ward transfers and clinical area of admission

The 450 patients averaged 1.7 intra-ward transfers (including from the ED) per hospitalisation or 1.2 transfers if ED was excluded.

Examination of the 263 patients (including direct admissions) who were admitted to a ward/unit demonstrated that the majority experienced one transfer only (from ED). Four patients (1.5%) experienced three transfers, forty-two (16.0%) had two transfers, 204 (77.5%) one transfer while the 13 (4.9%) direct admission patients remained in the one area thereby having nil transfers.

Figures 2 to 5 demonstrate the number of transfers and the clinical areas to which patients were admitted. Patients who had three transfers (Figure 2) were all admitted to the Coronary Care Unit (CCU) as their first clinical area compared to 58.5% who had two transfers (Figure 3) and 7.3% who had one transfer (Figure 4). A total of seventeen patients (Figures 3 and 4) were discharged home from CCU, two of whom were initially admitted to sub-acute coronary care (SAC) and later transferred to CCU. Forty-eight patients were discharged from SAC (Figures 3 and 4), the majority (n=36) being both admitted to and discharged from the step-down unit.

Twenty-one patients were transferred to the cardiology ward after being admitted to CCU or SAC (Figures 2 and 3), while 74 patients were admitted to the cardiology ward from ED (Figure 4). A total of 69 patients were admitted to medical wards as their initial clinical area, and of these 56 were not transferred again. Twenty patients were admitted to wards of other clinical specialities (eg, oncology, aged care and obstetrics), while 16 patients were admitted to surgical wards as their first clinical area (Figures 3 to 5).

Figure 2: Clinical area, patient numbers and ALOS for patients who had three transfers

Clinical area	Patient Numbers	Patient Numbers	Patient Numbers	Total	% of Group
	1st clinical area	2nd clinical area	3rd clinical area (discharge ward)		
CCU	4	0	0	4	100.0
SAC	0	3	0	3	75.0
Cardiology ward	0	0	1	1	25.0
Medical ward	0	1	2	3	75.0
Surgical ward	0	0	1	1	25.0
Other ward	0	0	0	0	0.0
Total Patients	**4**	**4**	**4**	**12**	
ALOS per group	**9.0 (+/-8.1)**				
Median LOS	**5.50**				

Figure 3: Clinical area, patient numbers and ALOS for patients who had two transfers

Clinical Area	Patient Numbers	Patient Numbers	Total	% of Group
	1st clinical area	2nd clinical area (discharge ward)		
CCU	22	2	24	58.5
SAC	6	12	18	43.9
Cardiology ward	0	20	20	48.8
Medical ward	11	4	15	36.6
Surgical ward	2	1	3	7.3
Other ward	1	3	4	9.8
Total Patients	**42**	**42**		
ALOS per group	**3.86 (+/-2.83)**			
Median LOS	**3.0**			

Figure 4: Clinical area, patient numbers and ALOS for patients who had one transfer

Clinical Area	Patient Numbers (discharge ward)	% of Group
CCU	15	7.3
SAC	36	17.6
Cardiology ward	74	36.6
Medical ward	56	27.3
Surgical ward	12	5.9
Other ward	11	5.4
Total Patients	**204**	
ALOS per group	**2.91 (+/-3.27)**	
Median LOS	**2.0**	

Figure 5: Clinical area, patient numbers and ALOS for patients who had nil transfers

Clinical area	Patient Numbers	% of Group
CCU	0	0.0
SAC	0	0.0
Cardiology ward	1	7.7
Medical ward	2	15.4
Surgical ward	2	15.4
Other ward	8	61.5
Total Patients	**13**	
ALOS per group	**1.67 (+/-1.5)**	
Median LOS	**1.0**	

Average length of stay (ALOS)

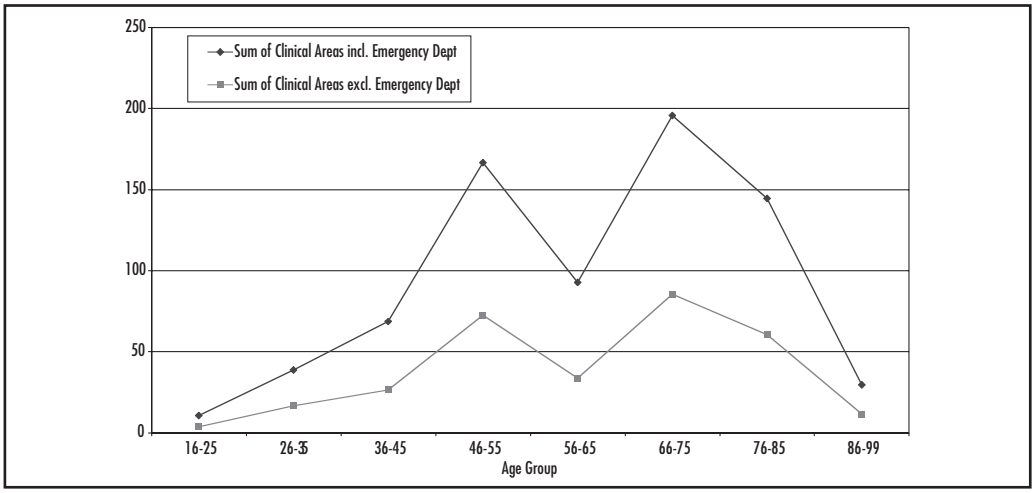
ALOS increased in proportion to the number of intra-ward transfers. Patients who were not transferred during their admission had the lowest ALOS of 1.67 days (median 1.0) followed by an ALOS of 2.94 days (median 2.0) for patients who had one transfer. Two intra-ward transfers resulted in an ALOS of 3.86 days (median 3.0) while patients with three transfers had an ALOS of 9.0 days (median 5.50). See Figures 2 to 5.

In this study, it was found that on average chest pain patients spent 25.24 hours (+/-14.4) in CCU and 29.31 (+/-26.78) hours in SAC. The ALOS for patients admitted to the cardiology ward for their entire admission (n=74) was longer although not statistically significant (p=0.404) compared to patients admitted to outlying medical wards. Cardiology ward patients had a mean hospital length of stay of 3.57 days (+/-4.15, median 3.0) compared to 3.05 days (+/-2.5, median 2.0) for medical ward patients (n=56). The ALOS for patients admitted to surgical wards (n=16) was 4.3 days (+/-5.87). Other outlying wards (eg, oncology, aged care and obstetrics) were not examined due to their diverse specialities.

Transfers and patient characteristics

The number of areas (and therefore transfers) to which patients were admitted corresponded with age and gender. Females had significantly more transfers compared to males (p=0.050) while patients aged 50 or more years were more likely to be transferred (p=0.041) and to have longer lengths of stay (p=0.00). Patients in the 66-75 year age group averaged 1.75 clinical areas per admission (ED included) or 0.77 areas if ED was excluded, followed by those in the 46-55 age group who averaged 1.74 areas (ED included) or 0.76 (ED excluded). Patients aged between 56-65 years averaged 1.58 areas (ED included) or 0.58 (ED excluded). See Figure 6.

Figure 6: Total clinical areas by age group



Admission characteristics

Friday was the most frequent admission day (20.22% or n=91), and weekends the least frequent. Patients admitted on a Friday tended to have a longer ALOS although this was not statistically significant (p=0.69). See Figure 7. Analysis of the 263 patients who were transferred to a ward or unit (excluding the 187 patients who were discharged from the ED) demonstrated that patients who were admitted on weekends and Mondays had a higher number of intra-ward transfers compared to those admitted midweek. Interestingly patients admitted on a Friday, despite having a longer length of stay, had the least number of transfers (refer to Figure 8).

Figure 7: Admission day, patient numbers and ALOS, all patients (n=450)

Admission Day	Patient Numbers	Percentage of Patients	ALOS (days)
Monday	71	15.78	2.6
Tuesday	83	18.44	2.0
Wednesday	63	14.0	1.9
Thursday	75	16.67	2.2
Friday	91	20.22	2.8
Saturday	32	7.11	2.1
Sunday	35	7.78	2.2

Figure 8: Admission day, number of transfers and ALOS, patients admitted to a ward/unit (n=263)

Admission Day	Number of Transfers	Percentage of Transfers	ALOS (days)
Monday	54	18.37	3.46
Tuesday	36	12.24	2.92
Wednesday	38	12.93	2.38
Thursday	43	14.63	3.47
Friday	29	9.86	4.32
Saturday	49	16.67	2.84
Sunday	45	15.31	2.88

Readmissions

The readmission rate was negligible with only 4.6% of patients (n=21) being admitted more than once with the same DRG during the study period. Of those readmitted, 3.6% (n=16) had two admissions while 1% (n=5) had three to five admissions. Some patients may have been readmitted under a different DRG but this was not examined.

Discussion

The total number of transfers occurring within hospitals at any given time should not be underestimated based upon the results of our study and other studies (Smith 1975; Deines & Stevens 1987; McGinty & Ghiz 1993; Patterson et al. 1995). This study only examined one classification of patients and intra-ward transfers, excluding room transfers within the same ward/unit and intra-hospital transfers.

The use of nursing staff to transfer patients is costly and is often perceived to be a waste of resources, diverting nurses away from "direct" clinical care. Evidence demonstrates that improved outcomes are related to higher nurse to patient ratios (Schultz et al. 1998). However, considering the number of transfers occurring daily and the time spent by nurses in co-ordinating and executing transfers, patient outcomes must be affected. The co-ordination and communication of patient transfers is customarily a manual process (Deines & Stevens 1987; Patterson et al. 1995) and one that could be considered to be outdated and inefficient. Using registered nurses to co-ordinate all patient transfers could be questioned, from cost and time perspectives, overall patient outcomes and the subsequent effect on length of stay.

The issue of breaking the continuity of care is important when considering patient transfers. Nurses are relinquishing responsibility for their patients at time of transfer and in so doing are challenging the concept of continuity of care. Effective communication between the transferring and receiving nurses, patients and their relatives is of utmost importance in maintaining continuity. Clinical pathways have been shown to reduce hospital lengths of stay, reduce associated costs and improve use of services in cardiology patients (Nichol et al. 1997; Kucenic & Meyers 2000). They could potentially improve intra-ward communication, enhance continuity of care, and ultimately reduce transfer times.

Step-down or intermediate units have evolved in an effort to reduce both the high costs associated with coronary care units and the care differential between the general ward and coronary care units, but they have added (in effect) one to two more transfer processes for the patient. Admission to coronary care for unstable angina patients has not been proven to be beneficial (Edmonds & Kelly 1997; Kelly et al. 1999) so it could be argued that patients with "unspecified chest pain" would gain minimal benefit from a coronary care admission.

The literature demonstrates that careful examination of patients with chest pain enables some to be discharged within 24 hours (Millane, et al. 1998; Senaratne et al 1999). A recent study found that Chest Pain Evaluation Areas resulted in more appropriate CCU admissions and a higher discharge rate for "non-cardiac" or "unknown" chest pain patients (Department of Human Services 2000).

Longer hospital stays for myocardial infarction patients are associated with the availability of technological resources as patients remain in hospital while awaiting investigative procedures (Carroll 1998). In effect, inpatient investigative procedures may result in one (more) intra-ward transfer and longer hospital stays. Anecdotal evidence suggests that patients (in this hospital) are remaining in hospital while waiting for investigative procedures.

Contrary to Czaplinski & Diers' (1998) evidence, admission to outlying medical wards (compared to the cardiology ward) did not negatively impact upon length of stay in this study while patients admitted to surgical wards did incur longer hospitalisations. Length of stay was associated with the number of transfers providing an argument for patients with chest pain to remain in medical wards rather than being transferred to the cardiology ward when beds are available.

The psychological impact on transferring patients was not examined in this study, but evidence has shown the adverse effect on patients and their families. It is particularly pertinent that older patients, who may be more likely to have comorbidities and perhaps more likely to experience transfer anxiety, are those who are frequently moved around.

Conclusion

Our study has demonstrated that patients admitted to this hospital with chest pain are admitted to a diverse range of clinical areas. Length of stay was negatively correlated with the number of intra-ward transfers, particularly in the 50-year plus age groups. Although not definitive, patients waiting for investigative procedures potentially remain in hospital longer and experience a greater number of intra-ward transfers.

Unexpectedly, patients admitted to the cardiology ward had slightly longer lengths of stay than those admitted to outlying medical wards, implying that management of chest pain patients on outlying areas is not adversely affected. In an effort to improve communication between managers and clinicians and reduce overall length of stay, it is recommended that clinical pathways be instigated for patients admitted with chest pain. Clinical pathways may ultimately assist with determining which patients are unnecessarily admitted to coronary care and thus help reduce the number of transfers in the chest pain population.

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