

children with urinary tract infections in Gothenburg. It is crucial to be aware of the high incidence of acute pyelonephritis in infants and small children as early treatment is important to prevent renal scarring.^{1,4} Immediate investigation of the urinary tract is performed in all infants and in older children with renal infections to detect obstructive malformations and vesicoureteric reflux. Patients at risk are continuously followed up through adolescence into adulthood and are repeatedly informed about the future risks and the need for early treatment of renal infections. We believe that this is the reason for the rather low rate of complications and the overall good outcome of pregnancies in our subjects. The low rate of legal abortions in the women with urinary infection in childhood compared with the controls may be another measure of the value of this education and the good access to medical care that these patients have had.

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Mortality in elderly patients admitted for respite care

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Abstract

Objective—To determine whether admitting elderly patients to hospital to give temporary relief to their carers is associated with increased mortality.

Design—Prospective multicentre study comparing the mortality of patients admitted on a one off or rotational basis with that experienced while they were awaiting admission.

Setting—A wide range of urban and rural district general, geriatric or long stay, and general practitioner hospitals.

Patients—474 Patients aged 70 or over who had 601 admissions.

Main outcome measure—Death.

Results—16 (3.4%) Of the 474 patients (2.7% of all 601 admissions) died while in hospital during an average stay of 15.7 days whereas 23 (4.9%) patients died while awaiting admission (average waiting time was 34.2 days). The 16 deaths in hospital and the 23 deaths during the longer waiting period correspond to death rates of 19.9 and 12.5 per 10 000 person days respectively. The difference between these of 7.4 is not statistically significant (95% confidence interval -3.6 to 18.3). The estimated relative risk of dying in hospital is 1.59 but the 95% confidence interval is wide (0.84 to 3.01).

Conclusion—Although the death rates are slightly higher in those admitted to hospital for relief care than in those awaiting admission, the difference was not significant, and the death rate in both groups was reassuringly small.

Introduction

A study of 69 elderly patients admitted to the Whittington Hospital in London between July 1980 and February 1983 to give relief or a holiday to their carers found that nine (13%) died in hospital—all

from bronchopneumonia.¹ Other researchers have also observed a high mortality under similar circumstances. DeLargy reported that of 100 patients admitted every 12 weeks for a six week stay 30 died in hospital over an 18 month period.² Twenty four patients died during their first or second temporary admission. This was not considered unusual in the general wards of a geriatric unit. Four (9%) of 46 patients entering a geriatric unit in Glasgow for temporary admission died during their stay and two died immediately after returning home.³ Ten others who returned home were deemed appreciably worse than on admission and eight, excluding the four who died, never returned home because of deterioration.

In correspondence responding to the disturbing report by Rai *et al*¹ mortality of 5% or less was reported in several hospitals admitting patients for temporary care.⁴⁻⁷ More recently a retrospective study examining whether psychogeriatric patients aged 65 or over had an increased risk of dying when admitted for relief care found that 19 (9%) of 210 patients, admitted for respite care on 218 occasions died in hospital whereas 29 (13.8%) died elsewhere, giving a relative risk of dying in hospital of 1.14.

We report a prospective study of the risk of death associated with admitting elderly patients for respite care in hospitals throughout the United Kingdom.

Patients and methods

All patients admitted to the study were aged 70 or over and incapable of looking after themselves, being cared for at home by one or more carers. The study was carried out prospectively over 12 months from February 1987. With the help of geriatricians in several centres patients were recruited from various types of hospital (district general, geriatric long stay, general practitioner, or private nursing home) distributed

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TABLE I—Details of hospitals and number of patients and admissions for respite care

		Approximate No of beds in 1987							
Centre	Hospital	District general hospital	Geriatric	Other*	No of male		No of female		Deaths
					Admissions	Patients	Admissions	Patients	
Belfast	Ulster	499	144		7	7	15	15	
Birmingham	Moseley Hall		241		9	8	4	3	1
	West Heath		187		3	3	1	1	
Bolton	Hulton		122		4	4	3	3	
	Bolton General	851			5	5	14	14	
	Blair		38		1	1	1	1	
Cambridge	Saffron Walden			108	6	5	5	5	
	Tower		84		2	2	—	—	
	Newmarket General	286			4	1	19	9	1
Cardiff	Chesterton		76		16	12	41	25	1
	Glan Ely		48		15	11	26	23	1
	Sully	171			4	3	2	2	
	St David's		237		4	4	9	7	
Cromer	Lansdowne		80		2	1	7	6	2
	Royal Infirmary	390			1	1			
	St Michael's			117	24	7	7	4	
Falkirk	Fletcher		66		5	3	4	2	
	Windsor		115		7	7	20	20	2
	Lochgreen		85		11	10	10	10	
Glasgow	Falkirk and District Royal Infirmary	454			7	6	13	13	1
	Meanskirk	539			20	20	68	65	2
Ipswich	Stow Lodge			111			1	1	
	St Edmund's Nursing Home†		14		—	—	40	31	
	Felixstowe General			28	1	1			
	Aldeburgh Cottage			17	2	2			
London	Nelson		112		27	21	30	25	2
New Forest	Lymington Infirmary		52		7	5	11	6	
Southampton	Moorgreen			245	15	12	13	10	1
Taunton	Williton and District		56		12	5	16	6	2
Total					221	167	380	307	16

*Other types of hospital include long stay and general practitioner hospitals.

†St Edmund's is run by the Women's Royal Voluntary Service for women only.

across the country and including patients living in rural and urban areas (see table I). The type of accommodation was also recorded (for example, large or small ward, single or double bedroom).

An admission for respite care, which would normally last for two and at the most three weeks, was defined as one arranged to allow the carers to take a prearranged holiday or rest that would be possible only if the patient was admitted to hospital. Admission could be prearranged on either a one off or regular rotational basis. Only those who were in a stable condition, as ascertained from reports of doctors and carers, were included. The interval between the booking and admission was normally at least one week for rotational admissions and four weeks for others, but exceptions were allowed if the patient's condition had not deteriorated or become unstable.

Information on the patient was obtained from five different colour coded forms: (a) notification from the

hospital of a respite admission being arranged; (b) a report from the carer on the patient's condition at the time of admission to hospital; (c) a report by the hospital doctor on the patient's condition when admitted; (d) a report by the hospital doctor at discharge outlining the patient's condition while in hospital with particular attention to any improvement or deterioration during the stay, and (e) a report from the carer submitted within six weeks of the patient's return home.

Our aim was to enlist 500 or more patients, expecting to observe around 50 deaths. In fact, we studied 694 admissions but 93 of these had to be excluded because of recording errors (33 cases), cancelled admission (32), admission for <14 days (10), or medical instability or deterioration (18). If an admission continued beyond three weeks for medical or other reasons the patient was still included in the study. Thus the final analysis was made on 601 actual or intended admissions relating to 474 patients. Patients were categorised as survivors, died in hospital during respite care, or died awaiting admission for respite care.

Results

Sets of forms that could be analysed, although not necessarily complete, were returned for a total of 474 patients who had had 601 admissions during the survey (table I). There were 221 admissions of 167 men (31 more than once) and 380 admissions of 307 women (56 more than once). Thus most patients were admitted on a one off basis. Sixteen (3.4%) patients (2.7% of all admissions) died in hospital during respite care and 23 (4.9%) patients died while awaiting admission for respite care. Details of those who died and the causes of death are shown in tables II and III.

Dates of booking, admission, and discharge were available for 499 of the 601 admissions. The average time spent waiting for admission was 34.2 days and that spent in hospital averaged 15.7 days. The 23

TABLE II—Details of patients who died during admission for respite care

Case No	Age (years)	Sex	Time (days) between			Cause of death and comments
			Booking and admission	Admission and death	Booking and death	
1	71	M	10	11	21	Bronchopneumonia, extension of existing stroke on day after admission
2	70	M	7	8	15	Haematemesis, hemiplegia
3	81	F	10	5	15	Chronic lymphatic leukaemia, admission coincided with need for terminal care
4	82	M	7	7	14	Chronic obstructive airways disease, myocardial infarction
5	90	F	3	3	6	Myocardial infarction
6	86	F	18	15	33	Myocardial infarction
7	100	F	4	31	35	Pneumonia
8	86	M	28	12	40	Bronchopneumonia
9	79	F	33	14	47	Myocardial infarction on day of proposed discharge
10	72	M	31	23	54	Bronchopneumonia, longstanding hemiplegia, deterioration led to prolonged admission
11	89	F	51	10	61	Cardiac arrest. Stroke
12	73	M	12	93	105	Stroke, bronchopneumonia
13	72	F	35	20	55	Bronchopneumonia. Carcinoma of the lung
14	85	F	28	44	72	Stroke during admission
15	83	M	70	25	95	Bronchopneumonia, stroke
16	83	F	20	24	44	Myocardial infarction, senile dementia

deaths during the waiting period and the 16 deaths in hospital were calculated to give a mortality of 12.5 and 19.9 per 10000 person days respectively. The difference between the two rates of 7.4 was not significant (95% confidence interval -3.6 to 18.3). The estimated relative risk of dying in hospital was 1.59, but the 95% confidence interval was wide (0.84 to 3.01).

Information on the occurrence of common complications (respiratory and urinary tract infections, bedsores) and the type of accommodation to which the patient was admitted was available for 492 admissions. We found no evidence that the type of accommodation influenced the incidence of these complications (table IV).

We have no accurate information on how the patients settled in hospital, but only 10 patients discharged themselves or were removed by their carers and 127 were admitted for respite care more than once.

We obtained information on changes in patients' condition during their stay in hospital for 325 admissions. In the 213 cases about which the hospital doctor and carer agreed the patient's condition was unchanged in 188 cases, improved in 17, and deteriorated in eight. Doctors and carers disagreed in 112 instances. Of these the doctor noted improvement but the carer no change in 21 cases, the doctor noted no change but the carer improvement in 38, the doctor observed no change but the carer noted deterioration in 38, the doctor found deterioration but the carer no change in eight, the doctor noted improvement but the carer deterioration in six, and the doctor noted deterioration but the carer noted improvement in one. These observations have an inbuilt source of inaccuracy

because the doctors assessed patients at the time of discharge from hospital whereas the carer's assessment was given up to six weeks later.

Discussion

The mortality of 3.4-4.9% found in this study is neither unexpected nor unacceptable in a group of elderly patients already so handicapped that they were unable to look after themselves. This low overall mortality should reassure patients, their carers, and the general public that respite care is not a cause for alarm. Although the mortality was somewhat greater for patients during hospital admission than at home, the increase was not significant.

The lower mortality during admissions for respite care in recent years is probably due to several factors including fewer severely ill patients being admitted, exclusion from the study of unstable patients who were clearly deteriorating, a greater awareness of patients' needs, and improved treatment of patients with fewer being admitted to hospitals for long term care as geriatrics has become a specialist subject.

Our study had several shortcomings. Ninety three admissions had to be excluded from the analysis, 33 because of inaccurate documentation. We may also have required the completion of too many forms, which were too complicated for the hospital staff and carers.

We hope this survey will encourage carers to take adequate breaks. Caring for an elderly person at home costs the carer both in economic and health terms. Nevertheless, care at home is cheaper than in hospital⁹ and it saves much government money at the expense of the carer's career, leisure time, finances, and family life. Admitting an invalid to a private nursing home is beyond the means of most people. Studies of carers have shown that they are under much physical and mental stress^{10,11} and that they are often elderly themselves (range 23 to 89 years, mean 61 years).¹²

Other steps are needed to make the carers' task easier, especially as help for carers varies regionally.⁹ Although charities, such as the National Council for Carers, operate schemes and provide support, over the whole of Britain the number of home help hours provided by the social services has decreased by 13.6%, and in many areas home helps now have to be paid for by the carer.¹⁰ Furthermore, support is less likely if the dependant lives with the carer especially if the carer is female.¹²

Perhaps the most promising development is that the Independent Living Fund will play an increasing part in funding carers or domestic help for the elderly, thus improving the quality of community care and diminishing the need for long term hospital treatment.¹³

We thank all the consultants, junior medical and nursing staff, and social and other workers who participated in this survey. Professor Whitfield contributed much to the design of this study.

TABLE III—Details of patients who died while awaiting admission for respite care

Case No	Age (years)	Sex	Interval between booking and death (days)	Cause of death and comments*
17	85	F	6	Stroke
18	90	F	70	Chronic renal failure
19	77	F	7	Bronchopneumonia, stroke
20	81	F	42	Bronchopneumonia, diverticulitis with rectovaginal fistula
21	96	F	5	Peritonitis from ruptured diverticulitis
22	90	F	11	Bronchopneumonia
23	87	F	34	Stroke
24	85	F	6	Bronchopneumonia, hereditary telangiectasia
25	80	M	3	Stroke
26	85	F	31	Carcinoma of vulva, inanition
27	79	F	14	Myocardial infarction
28	88	F	23	Acute admission for stroke and died shortly afterwards
29	90	F	53	Renal failure, chronic pyelonephritis
30	91	F	0	Died on the day booking was made
31	90	F	10	Stroke, bronchopneumonia
32	87	F	17	Stroke
33	75	M	21	Bronchopneumonia, parkinsonism
34	87	F	12	Myocardial infarction
35	76	M	11	Stroke, bronchopneumonia. Emergency admission
36	80	M	24	Bronchopneumonia, died four days before next arranged admission
37	97	F	8	Stroke
38	91	F	23	Hypertensive heart failure
39	87	F	18	Bronchopneumonia

*Those who died in hospital had been taken ill at home and had been admitted for acute conditions not for respite care.

TABLE IV—Number (percentage) of main complications arising during 492 admissions for respite care according to patients' accommodation

	Large ward	Small ward	Shared room	Single room
Infection of lungs or bronchi	11 (6.3)	5 (2.6)	4 (6.4)	2 (3.4)
Infection of urinary tract	8 (4.5)	7 (3.6)	2 (3.2)	1 (1.7)
Bedsores	3 (1.7)	4 (2.1)	1 (1.6)	
Total admissions	176	194	63	59

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Comparison of Teflon cannulas and metal needles for subcutaneous infusion in terminal care: a pilot study

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Continuous subcutaneous infusion of narcotics and other drugs has been increasingly used in terminal care to control symptoms.¹ Failure of the infusion may be due to failure of the machine or battery, blockage of the tubing or cannula, disconnection, or a local skin reaction. Local skin reactions, such as erythema, swelling, and abscesses, are the principal problem; they may affect drug absorption profiles and necessitate frequent resiting of the cannula.² Drugs are commonly administered through a subcutaneous indwelling butterfly needle, but a metal needle may itself cause local reactions. British Standard 4843 states, "Materials used in manufacturing cannulae must not be detrimental to any body tissues."³ We therefore determined whether the incidence of local skin reactions could be reduced by giving the drugs through Teflon cannulas.

Patients, methods, and results

We compared Teflon cannulas (Jelco standard wire gauge 22; Critikon, Ascot, Berkshire) and butterfly metal needles (standard wire gauge 23; Abbott, Ireland) under conditions of normal clinical practice. Patients were randomised to have either a butterfly needle or a Teflon cannula inserted under aseptic conditions, and the site of insertion was covered with a transparent dressing (Opsite; Smith and Nephew, Hull). The site was observed daily by nursing staff. When a complication occurred the needle or cannula was removed and the infusion continued through the alternative device. The trial was concluded when the patient had had both a needle and a Teflon cannula removed, although the subcutaneous infusion was continued as required for clinical management.

For each patient we used a standard form to record demographic data; type of cancer; date, time, and site of insertion of the needle and cannula; and reasons for removing the needle and cannula. The dose of drugs infused each day was also recorded. Twenty patients entered the trial, 12 of whom completed it (table).

Eight patients died before either the first or second infusion device had to be removed.

The periods for which the needle and cannula were in place were comparable (Wilcoxon's rank sum test). The incidence of local complications was compared with McNemar's test. Significantly fewer patients experienced swelling when a Teflon cannula was inserted ($p<0.05$), but the incidence of erythema associated with the cannula, although less than that associated with the butterfly needle, was not significantly different ($p=0.1$). The high incidence of mechanical problems with the Teflon cannulas especially kinking and displacement, however, meant that they needed replacing as often as the metal needles, and acute withdrawal symptoms resulted in one patient.

Comment

A metal cannula under the skin can cause trauma in the underlying tissues, and partly for this reason they are no longer used for continuous intravenous infusion. Ventafridda *et al* suggested that using Teflon cannulas to give drugs subcutaneously may eliminate the problems of skin reactions,¹ but this suggestion has never been examined. We found the mechanical problems with the Teflon cannulas to be the major drawback. Partial withdrawal and hence kinking of the cannula that we used may be due to the design of its hub as it does not have wings for stabilisation. We chose this type of cannula in preference to the more practical winged Teflon cannula because sepsis may occur at the injection port of the winged type.⁴

As Teflon cannulas were associated with fewer skin reactions we suggest that winged Teflon cannulas should be evaluated further: bolus injections at the port should be avoided or a cannula without an injection port could be assessed. This might overcome the mechanical problems while retaining the advantages.

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Local complications in 12 patients who received drugs through Teflon cannula and metal butterfly needle

Case No	Teflon cannula			Metal needle		
	Site	No of days in place	Reason for removal	Site	No of days in place	Reason for removal
1	Chest wall	2	Removed accidentally	Abdomen	2	Blocked
2	Chest wall	2	Removed accidentally	Abdomen	2	Blocked
3		2	Cannula kinked and blocked	Upper arm	6	Erythema and swelling
4	Upper arm	12	Erythema and swelling	Chest wall	2	Erythema and swelling
5	Upper arm	2	Cannula kinked and blocked	Upper arm	4	Erythema and swelling; patient complained of soreness
6	Upper arm	4	Erythema, cannula kinked	Upper arm	6	Erythema and swelling
7	Upper arm	6	Cannula kinked	Upper arm	1	Swelling
8	Upper arm	1	Removed accidentally	Upper arm	2	Tube blocked and bleeding at site
9	Upper arm	2	Erythema and swelling	Upper arm	1	Erythema and swelling
10	Upper arm	2	Cannula kinked	Upper arm	4	Erythema and swelling
11	Upper arm	3	Removed accidentally	Upper arm	7	Erythema and swelling
12	Upper arm	7	Cannula kinked	Upper arm	7	Removed accidentally

* $p<0.05$ for swelling, $p=0.1$ for erythema, 50% incidence of kinking with Teflon cannulas.