

## SCIENTIFIC LETTER

## Hospital burden of suspected acute coronary syndromes: recent trends

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No study has described the burden to a health service of the complete spectrum of possible acute coronary syndromes (ACS). The objective of this study was to describe the changing burden of suspected ACS on the hospital sector of the National Health Service in Scotland over the period 1990–2000.

## METHODS

The record linkage system for discharges from Scottish hospitals and deaths has been described previously.<sup>1</sup> We identified all emergency hospitalisations of patients  $\geq 18$  years old in Scotland between January 1990 and December 2000 where acute myocardial infarction (AMI; *International classification of diseases*, (ICD), ninth revision, code 410, ICD-10 I21, I22), angina (ICD-9 411, 413, ICD-10 I20, I249), or chest pain (ICD-9 786.5, ICD-10 R07) was coded as the principal diagnosis on discharge. Numbers and age and sex specific rates of discharges (and patients discharged), length of stay, revascularisation procedures, and deaths were studied. We used linear regression to examine trends in population hospitalisation rates, hospitalisation numbers, and length of stay.

## RESULTS

Between 1990 and 2000, a total of 263 917 people (55% men) were hospitalised with one or more suspected ACS: 117 479 for AMI, 71 927 for angina, and 123 123 for chest pain (a person may have had more than one ACS). The number of patients with a discharge diagnosis of any suspected ACS increased steadily between 1990 and 2000, rising by about 41% (51% in women and 34% in men) due to an increase in hospitalisations for angina and chest pain (table 1).

The number of men and women hospitalised with angina almost doubled, although hospitalisations for angina appeared to plateau over the last 3–4 years of the study period (table 1).

The number of patients hospitalised with chest pain rose, year on year, whereas the number of people admitted with AMI declined substantially (by about 30%).

Rates of AMI among men and women declined similarly across age groups and the greatest reductions were seen in middle aged patients (55–74 years). The increase in angina was larger in men than in women across all age groups and was greatest in the oldest age category (75 years or older). Hospitalisation rates for chest pain increased more for women than for men overall; among women the greatest increase was in those aged 55 years or younger (whereas these discharges rose more in older than in younger men).

The proportion of hospitalisations in different age groups changed over the period of study with patients generally getting older (most notable in those with angina, less so in AMI with little change in age of those with chest pain).

In 1990, 10% of men and 9% of women had two or more hospitalisations within the same calendar year. By 2000, this proportion had increased to 14% and 12%, respectively.

Suspected ACS accounted for 20.2% of emergency hospitalisations in 1990 and 19.2% in 2000.

For AMI, the median length of stay decreased from eight to six days between 1990 and 2000, for angina from four to three days, and for chest pain from three to one day. Total bed days for any suspected ACS declined 25% from 300 304 days in 1990 to 225 033 days in 2000 because of the reduction in AMI bed days. Suspected ACS accounted for 16.6% of medical bed days in 1990 and only 12.4% in 2000.

Table 1 Hospitalisation for suspected acute coronary syndromes (ACS) in Scotland, 1990–2000

	ACS		AMI		Angina		Chest pain	
	1990	2000	1990	2000	1990	2000	1990	2000
Number of patients hospitalised	25643	36187	13105	9153	5226	10593	8693	18933
Population rates per 100000								
Both sexes	653	915	334	231	133	268	221	479
Men	800	1 065	421	294	155	311	270	539
Women	522	781	225	157	113	229	178	425
<65 years	417	606	162	102	89	142	191	400
$\geq 65$ years	1631	2136	1044	742	315	765	346	791
Total bed days	300304	225033	203398	96422	46173	62292	50733	66319
Bed days/1000 population	76.5	56.9	51.8	24.4	11.8	15.8	12.9	16.8
Proportion of medical bed days	16.6%	12.4%	11.3%	5.3%	2.6%	3.4%	2.8%	3.7%
Proportion of all medical emergency admissions	20.2%	19.2%	9.4%	4.2%	4.1%	5.6%	6.6%	9.4%
Median length of stay (days)	6	3	8	6	4	3	3	1
Number of patients undergoing revascularisation within calendar year	451 (1.8%)	1 723 (4.8%)	171 (1.3%)	682 (7.5%)	262 (5.0%)	1 025 (9.7%)	96 (1.1%)	277 (1.5%)
30 day case fatality	11.9%	5.5%	22.2%	19.4%	1.5%	1.5%	1.6%	0.7%

In 1990, 1.6% of men and 0.9% women hospitalised with AMI subsequently underwent revascularisation within the same calendar year. By 2000, the rate had increased sixfold for men and fivefold for women.

In 1990, 6.4% of men and 3.3% of women hospitalised for angina underwent revascularisation. The rate increased 1.9-fold for both men and women by 2000.

## DISCUSSION

The number of patients discharged with suspected ACS increased by 50% over the past decade due to a doubling of hospitalisations for angina and chest pain and despite a 30% decline in hospitalisations for AMI. Though the overall number of hospitalisations has increased, the extra burden placed on the hospital sector was ameliorated by a fall in length of stay.

The rise in hospitalisations for angina and chest pain and the changing clinical practice led to a three- to fourfold increase in coronary revascularisation procedures.

The increase in rates of hospitalisation was particularly large for angina and, to a smaller extent, for chest pain in older age groups. Proportionally, these age groups are going to increase in number as the population ages.

The rise in hospitalisations for chest pain, not thought to reflect coronary disease, in younger people, especially women, is a puzzling and unexplained phenomenon and supports the development of services to prevent these mainly unnecessary admissions or to expedite exclusion of coronary disease and early discharge.<sup>2-5</sup>

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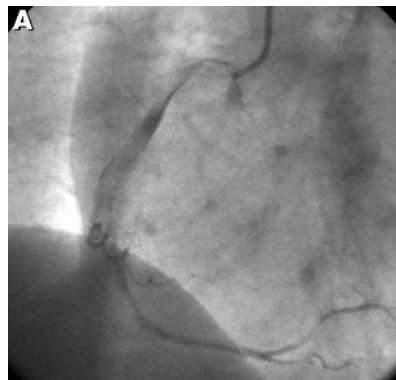
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### Spontaneous healing of a severe coronary artery dissection

**A** 63 year old woman with a history of coronary artery disease was referred to our hospital for an elective percutaneous coronary intervention (PCI) because of progression of angina pectoris. Angiography showed severe stenoses of the proximal and mid circumflex artery and of the proximal and mid right coronary artery (RCA).

The lesions in the circumflex artery were successfully dilated and stented with two drug eluting stents. Angioplasty of the mid RCA was successfully performed and a drug eluting stent was placed. After balloon angioplasty of the proximal right coronary artery, it was obvious that the patient needed to urinate urgently. While she was urinating, the guide catheter and the guidewire were lost from the RCA. Subsequent angiography revealed a severe spiral dissection type F, with decreased coronary flow in the RCA (TIMI flow I, panel A). It was impossible to re-enter the true lumen. Because the patient did not suffer any chest pain and there were no signs of ischaemia at the ECG, no further intervention was performed. During hospitalisation the patient remained stable and blood samples did not reveal any sign of myocardial infarction. Angiography one month after the PCI showed the RCA without any signs of dissection or stenosis (panel B).



Proximal dissection of the right coronary artery with TIMI flow I.



Angiography of the right coronary artery one month after the dissection caused by the angioplasty, with no signs of dissection or stenosis.

This episode of severe dissection of the right coronary artery healed spontaneously. Therefore, when a coronary dissection without any signs of ischaemia occurs, it is wise to follow an expectative policy. Nature is mild!

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