

## BRITISH CARDIOLOGY

## Cardiac interventional procedures in the United Kingdom in 1989

Peter J B Hubner on behalf of the British Cardiovascular Intervention Society

Table 1 Percutaneous transluminal coronary angioplasty in 1989

| Country                  | No/million population |
|--------------------------|-----------------------|
| United States of America | 1028                  |
| Belgium                  | 510                   |
| Holland                  | 462                   |
| Canada                   | 405                   |
| West Germany             | 398                   |
| France                   | 327                   |
| Switzerland              | 277                   |
| Austria                  | 258                   |
| United Kingdom           | 126                   |
| Italy                    | 56                    |
| Spain                    | 51                    |

\*Source: Intervention Ltd, 1 Redman Court, Bell Street, Princes Risborough, Buckinghamshire.

Table 2 Percutaneous transluminal coronary angioplasty in the United Kingdom in 1989: Number of procedures per annum in 53 cardiac units

| Procedures | Units |
|------------|-------|
| 0-50       | 8     |
| 51-100     | 15    |
| 101-150    | 7     |
| 151-200    | 11    |
| 201-250    | 6     |
| 251-300    | 5     |
| 301-350    | 1     |

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The British Cardiovascular Intervention Society circulated all cardiac units performing adult and paediatric interventional procedures to request information on the procedures that had been performed between 1 January and 31 December 1989. This was the second year of this form of audit and the data are more comprehensive than those of the 1988 survey.<sup>1</sup> It is believed that all cardiac units (53 adult, 17 paediatric) performing these procedures have been included. All the nine private hospitals were surveyed. Only four of the 44 adult National Health Service units and two of nine private units did not supply adequate information. The results of this survey should be read in conjunction with those of 1988 survey.<sup>1</sup>

## Percutaneous transluminal coronary angioplasty

## NUMBER OF PROCEDURES

There were 7148 procedures recorded, representing 126 per million of the population. This is a 42% increase on the 1988 figure. Table 1 compares the United Kingdom figures with those from other countries. In 1989 920 procedures (12.8% of the total number of percutaneous transluminal coronary angioplasties) were performed in private hospitals. The number of cardiac units performing 150 or more procedures per annum increased from 13 to 23 (table 2).

## RESULTS OF PERCUTANEOUS CORONARY ANGIOPLASTY

Some cardiac units were unable to provide full data in response to all the questions that were asked. The results in this survey and its tables show the number of cardiac units and the number of procedures from which the information was derived.

Tables 3 to 5 show the overall results of percutaneous transluminal coronary angioplasty and the results from single vessel dilatation and from multivessel dilatation in 1989. The overall results for percutaneous transluminal coronary angioplasty show an improvement since 1988 with mortality falling from 0.77% to 0.65% and the need for emergency coronary artery bypass grafting falling from 2.71% to 2.07%. The frequency of myocardial infarction and the success rate were unchanged. For multivessel dilatation

the need for emergency coronary artery bypass grafting fell from 4.7% in 1988 to 1.7% in 1989. The mortality for multivessel dilatation remains greater than that for single vessel dilatation reflecting more advanced coronary artery disease and a more complicated procedure.

## CLINICAL SETTINGS OF PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY (TABLE 6)

The results were much as expected with a lower success rate (52%) for chronic occlusion and a higher mortality for percutaneous transluminal coronary angioplasty performed within 48 hours of the onset of acute myocardial infarction and without

Table 3 Percutaneous transluminal coronary angioplasty in the United Kingdom during 1989

|   | %    | Range (%) | n    |
|---|------|-----------|------|
| Cardiac units                             | —    | —         | 53   |
| Total cases                               | —    | —         | 7148 |
| Mortality                                 | 0.65 | 0-3.3     | 6571 |
| Emergency coronary artery bypass grafting | 2.07 | 0-6.6     | 6571 |
| Myocardial infarction                     | 2.26 | 0-6.3     | 5386 |
| Success                                   | 87   | 71-100    | 5762 |

Table 4 Percutaneous transluminal coronary angioplasty in the United Kingdom in 1989: single vessel dilatation

|   | %    | Range (%) | n    |
|---|------|-----------|------|
| Cardiac units   | —    | —         | 36   |
| % of total percutaneous transluminal coronary angioplasty | 84   | 59-100    |      |
| Mortality   | 0.42 | 0-1.9     | 4043 |
| Emergency coronary artery bypass grafting                 | 1.6  | 0-5.3     | 4043 |
| Myocardial infarction                                     | 2.4  | 0-6.9     | 3669 |
| Success   | 87   | 75-100    | 4043 |

Table 5 Percutaneous transluminal coronary angioplasty in the United Kingdom in 1989: multivessel dilatation

|   | %   | Range (%) | n   |
|---|-----|-----------|-----|
| Cardiac units   | —   | —         | 31  |
| % of total percutaneous transluminal coronary angioplasty | 17  | 4-41      |     |
| Number of vessels   | —   | —         | 2.2 |
| Mortality   | 1.3 | 0-20      | 853 |
| Emergency coronary artery bypass grafting                 | 1.7 | 0-20      | 853 |
| Myocardial infarction                                     | 2.5 | 0-14      | 719 |
| Success   | 87  | 13-100    | 853 |

Table 6 Percutaneous transluminal coronary angioplasty in the United Kingdom in 1989: clinical settings

|   | Repeat percutaneous coronary angioplasty | Chronic occlusion | Previous coronary artery bypass grafting | Unstable angina | Post thrombolysis | Acute myocardial infarction |
|---|--|-------------------|--|-----------------|-------------------|-----------------------------|
| Cardiac units                                 | 37                                       | 34                | 36                                       | 33              | 20                | 17                          |
| Total procedures                              | 502                                      | 457               | 349                                      | 631             | 138               | 41                          |
| Vessels                                       | 548                                      | 469               | 436                                      | 716             | 149               | 45                          |
| Mortality (%)                                 | 0.19                                     | 0.65              | 0.28                                     | 0.95            | 0                 | 4.87                        |
| Emergency coronary artery bypass grafting (%) | 0.79                                     | 0.87              | 0.28                                     | 1.74            | 0                 | 0                           |
| Myocardial infarction (%)                     | 0.39                                     | 0.65              | 2.86                                     | 3.48            | 1.44              | 9.7                         |
| Success (%)                                   | 93                                       | 52                | 84                                       | 89              | 93                | 84                          |

prior thrombolysis. For this survey we defined percutaneous transluminal coronary angioplasty for unstable angina as being performed within two weeks of hospital admission for rest pain. Percutaneous transluminal coronary angioplasty after thrombolysis was defined as this procedure being performed within two weeks after thrombolysis for acute myocardial infarction.

#### NUMBERS OF FIRST OPERATORS FOR PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY

A first operator is defined as someone who is able to perform percutaneous transluminal coronary angioplasty without supervision. The average number of first operators per centre rose from 2 to 3.3 in 1989.

#### FUNDING FOR PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY

As with the 1988 survey most cardiac units have no specific budget and for those that have there seems to be no relation between size of budget and numbers of procedures performed.

#### SURGICAL COVER FOR PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY (TABLE 7)

In view of the interest and debate over the topic<sup>2,3</sup> the complications from the six cardiac units with off site surgical cover were com-

Table 7 Percutaneous transluminal coronary angioplasty in the United Kingdom in 1989: comparison between cardiac units with on site and off site cardiac surgical cover

|   | On site             | Off site  |
|---|---------------------|-----------|
| Cardiac units                             | 45                  | 6         |
| Numbers                                   | 6146                | 425       |
| Mortality                                 | 40 (0.65%)          | 3 (0.71%) |
| Emergency coronary artery bypass grafting | 130 (2.12%)         | 6 (1.41%) |
| Myocardial infarction                     | 116 of 4861 (2.39%) | 6 (1.41%) |

Table 8 Balloon dilatation of valves in adults in the United Kingdom in 1989

| Type                 | Units | Number | Deaths   | Complication |
|----------------------|-------|--------|----------|--------------|
| Pulmonary            | 11    | 14     | 0        | 0            |
| Aortic               | 18    | 83     | 5 (6%)   | 1            |
| Mitral               | 16    | 112    | 4 (3.6%) | 8            |
| Coarctation of aorta | 5     | 22     | 0        | 1            |
| Miscellaneous        | 4     | 4      | 0        | 0            |

pared with those from 45 cardiac units that had cardiac surgery on site.

The mortality was similar at both types of cardiac unit, but the rates for emergency coronary artery bypass grafting and myocardial infarction were lower in the cardiac units with off site surgery.

#### Balloon dilatation of valves in adults (table 8)

The frequency of balloon dilatation of aortic and mitral valves became reversed from 1988, with more mitral valves being dilated in 1989. The mortality of balloon dilatation of the mitral valve remained unchanged at 3.6% and there was a 7.1% incidence of serious (non-fatal) complications. Balloon dilatation of coarctation of aorta increased from seven to 22 procedures. Complications refer to significant local or general complications.

#### Paediatric interventional procedures (table 9)

Information was available from more cardiac units in 1989 (17 units) than in 1988 (11 units). Even allowing for this there has been a large increase in the number and scope of paediatric interventional procedures, which increased from 337 to 610.

#### Comments on the 1989 Survey of Procedures

The 1989 audit of interventional procedures was more complete than that of 1988. Basic minimum information was obtained from all

Table 9 Paediatric interventional procedures in the United Kingdom in 1989

| Procedure                             | Units | Number | Death | Complications |
|---------------------------------------|-------|--------|-------|---------------|
| Pulmonary valve dilatation            | 17    | 212    | 1     | 3             |
| Aortic valve dilatation               | 12    | 78     | 1     | 0             |
| Coarctation of aorta                  | 11    | 105    | 0     | 1             |
| Closure of ductus arteriosus          | 10    | 115    | 0     | 2             |
| Mustard conduit dilatation            | 8     | 15     | 0     | 0             |
| Pulmonary artery or branch dilatation | 8     | 22     | 0     | 0             |
| Fallot's tetralogy dilatation         | 3     | 30     | 1     | 0             |
| Shunt dilatation                      | 3     | 2      | 0     | 0             |
| Blade septostomy                      | 5     | 8      | 0     | 0             |
| Embolisation                          | 4     | 11     | 0     | 0             |
| Miscellaneous                         | 3     | 12     | 0     | 0             |

centres, including all the private ones. Many cardiac units had difficulty in providing complete data but there has been an improvement since 1988.

The number of percutaneous transluminal coronary angioplasties per million population in the United Kingdom in 1989 remains very much lower than that of United States and many countries in Europe. Funding for percutaneous transluminal coronary angioplasty and other interventional procedures continues to be very haphazard and inadequate. Paediatric interventional procedures are increasing both in numbers and range and carry a low mortality and morbidity.

The British Cardiovascular Intervention Society is grateful to the staff who compiled the data requested from each centre. The following centres took part in the 1989 survey.

#### Adult centres

Aberdeen Royal Infirmary, Belfast City Hospital, Belfast Royal Victoria Hospital, Birmingham Dudley Road Hospital, Birmingham, East Birmingham Hospital, Birmingham Queen Elizabeth Hospital, Blackpool Victoria Hospital, Bristol Royal Infirmary, Brook Hospital, Cambridge Papworth Hospital, Cardiff University Hospital, Coventry Walsgrave Hospital, Cromwell Hospital, Edinburgh Royal Infirmary, Edinburgh Western General Hospital, Glasgow Ross Hall Hospital, Glas-

gow Royal Infirmary, Glasgow Stobhill Hospital, Glasgow Victoria Hospital, Glasgow Western Infirmary, Guy's Hospital, Hamersmith Hospital, Harefield Hospital, Harley Street Clinic, Hull Royal Infirmary, King's College Hospital, Leeds BUPA Hospital, Leeds General Infirmary, Leeds Killingbeck Hospital, Leicester BUPA Hospital, Leicester Groby Road Hospital, Liverpool Broadgreen Hospital, London Bridge Hospital, London Chest Hospital, London Hospital, London Independent Hospital, Manchester Alexandra Hospital, Manchester Royal Infirmary, Manchester Wythenshawe Hospital, Middlesex Hospital, National Heart/Brompton Hospital, Newcastle Freeman Hospital, Oxford John Radcliffe Hospital, Royal Free Hospital, Sheffield Northern General Hospital, Southampton General Hospital, Stoke City Hospital, St Bartholomew's Hospital, St George's Hospital, St Mary's Hospital, St Thomas's Hospital, Wellington Humana Hospital, Westminster Hospital.

#### Paediatric Centres

Belfast Regional Medical Cardiology Centre, Birmingham Childrens Hospital, Bristol Royal Hospital for Sick Children, Brompton Hospital, Cromwell Hospital, Edinburgh Royal Hospital for Sick Children, Glasgow Royal Hospital for Sick Children, Great Ormond Street Hospital, Guy's Hospital, Hamersmith Hospital, Harefield Hospital, Leeds Killingbeck Hospital, Leicester Groby Road Hospital, Liverpool Royal Childrens Hospital, Manchester Royal Childrens Hospital, Newcastle Freeman Hospital, Southampton General Hospital.

- 1 Hubner PJB. Cardiac interventional procedures in the United Kingdom during 1988. *Br Heart J* 1990;64:36-7.
- 2 Parker DJ. Does angioplasty need on site surgical cover? A surgeon's view. *Br Heart J* 1990;64:1-2.
- 3 Shaw TRD. Does angioplasty need on site surgical cover? A physician's view. *Br Heart J* 1990;64:3-4.