Outcome of percutaneous coronary intervention in acute coronary syndromes: from clinical trials to clinical practice

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Abstract

Early angiography and revascularisation are beneficial for patients with non-ST segment elevation myocardial infarction (NSTEMI). However, the Prospective Registry of Acute Ischaemic Syndromes in the UK (PRAIS-UK) demonstrated low levels of revascularisation in the UK in patients at high cardiovascular risk.

In the study described here, the authors attempted to streamline their referral process for acute revascularisation and conducted an audit to quantify the delay and to monitor outcomes. There were 1,640 percutaneous coronary interventions (PCIs) in West Yorkshire during the year 2000; of these 45% were acute interventions. The catheter laboratory database identified 212 acute PCI patients with a Leeds city postcode.

Average times from admission to angiogram, angiogram to intervention, and intervention to discharge are described, as are patient characteristics. Acute and six-month outcome data are given for the whole cohort and for a high-risk subgroup. The six-month composite rate of death and myocardial infarction was lower than that observed in PRAIS-UK. The data show that the time delay between admission and intervention can be kept to a reasonable level.

Key words: acute coronary syndromes, percutaneous coronary intervention, angiography, revascularisation, outcome.

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Introduction

Recent studies have shown the benefit of early angiography and revascularisation in patients admitted with unstable angina and non-ST-segment elevation myocardial infarction (NSTEMI).[1-3] All three of these studies were representative of contemporary practice, which includes coronary stenting and the use of glycoprotein IIb/IIIa receptor antagonists. They randomised patients with unstable angina and NSTEMI to either an early invasive strategy with cardiac catheterisation within 72 hours or to a conservative strategy where cardiac catheterisation was only performed on objective evidence of recurrent ischaemia. In the FRagmin and Fast Revascularisation during InStability in Coronary artery disease (FRISC II) study,[1] 71% of the early invasive group were revascularised within 10 days versus 9% of the conservative group. There was a significant reduction in the composite end point of death and myocardial infarction (MI): this occurred in 9.4% of the invasive group, compared with 12.1% of the non-invasive group (p=0.031), at six months. This reduction was even more significant at one year (10.4% in the early invasive group versus 14.1% in the conservative group, p=0.005).[4] The patients in FRISC II were high-risk patients, with a risk of death or MI at six months of 12.1% in the conservative group.

In the Treat Angina with Aggrastat and determine Cost of Therapy with an Invasive or Conservative Strategy (TACTICS-TIMI 18) trial,[2] 60% of the 'early invasive' group underwent revascularisation during the initial hospital admission, versus 36% in the conservative strategy. Once again there was a significant reduction in the composite end point of death and MI: this occurred in 7.3% of the early invasive group versus 9.5% of the conservative group (p<0.05) at six months. The patients in this study were also high-risk, with a risk of death or MI at six months of 9.5% in the conservative group.

In the Randomised Intervention Treatment of Angina (RITA 3)[3] trial, 44% of the patients in the early invasive strategy group underwent revascularisation during the initial hospital admission, versus 10% in the conservative strategy group. The composite end point of death and MI occurred in 7.6% of the early invasive group versus 8.3% of the conservative group (p=0.58) at one year. The patients in RITA 3 were described by the investigators as moderate-risk patients, with a risk of death or MI at one year of 8.3% in the conservative group. In 2000, the joint American College of Cardiology/American Heart Association and the European Society of Cardiology guidelines were published,

which recommended early invasive management in high-risk patients as well as patients who fail medical therapy.[5,6]

UK practice – how do we compare?

In an international registry, Organisation to Assess Strategies for Ischaemic Syndromes (OASIS) of unstable angina and NSTEMI, the composite risk of death or MI at six months was 11%.[7] In the Prospective Registry of Acute Ischaemic Syndromes in the UK (PRAIS-UK), a national registry of unstable angina and NSTEMI, the composite rate of death or MI at six months was higher, at 12.2%.[8] However, PRAIS-UK demonstrated low levels of coronary revascularisation, with a rate of percutaneous coronary intervention (PCI) during the initial admission of 4% and at six months of 8%. This is much lower than in the Global Registry of Acute Coronary Events (GRACE) international registry, where 28% of patients with NSTEMI and 18% of patients with unstable angina underwent PCI during the initial hospital admission.[9]

PRAIS-UK demonstrated a low level of revascularisation in the UK in patients with high cardiovascular risk. This was a reflection of practice in 1998; rates of coronary intervention in the UK have increased since then.[10] In many centres, however, this has resulted in long delays before patients are transferred to the regional centre for intervention. As a result, many patients undergo intervention outside the time window that has been proven to be efficacious.

Clinical practice in Leeds

We attempted to streamline our referral process for acute revascularisation, and conducted an audit to quantify the delay and to monitor outcomes. The total number of PCIs in West Yorkshire for the year 2000 for a population of 2.8 million was 1,640, of which 45% were acute interventions. We searched the catheter lab database for all acute PCIs done in the year 2000 on patients with a Leeds city postcode. A total of 212 patients were identified. The notes were traced and the clinical data from the index admission, plus follow-up data for up to six months, were entered into a spreadsheet. Patients who did not have six months' follow-up recorded in the notes were contacted by telephone.

The average time from admission to angiogram was 3.8 days, the average time from angiogram to intervention was 0.4 days, and the average time from intervention to discharge was 1.9 days. The characteristics of the patients were as follows: the mean age was 62.6±10.3 years (range 35–87), 65% were men, 16.2% were diabetic, 27.6% had previous MI, 11.6% had previous PCI, and 12.1% had previous coronary artery bypass grafting (CABG). The ECG series showed ST segment elevation in 30.6%, ST depression in 21.7% and T wave inversion in 26.1% of patients. Coronary angiography indicated that 41.9% had single-vessel disease, 32.9% had two-vessel disease and 25.2% had three-vessel disease. In 71.4% of patients only one coronary lesion was treated; in 19% two lesions were treated; and in 8.1% three lesions were treated. One stent was used in 56.2% of patients, two stents in 25%, three stents in 11.4%, and four stents or more in 1.9%. Of these patients only 5.2% did not receive a stent. Abciximab (ReoPro) was used in 30.1% of the patients.

Key messages

- There is mounting evidence for the benefit of early revascularisation in patients with unstable angina and NSTEMI
- The time delay between admission and intervention can be kept to a reasonable level
- Our six-month outcome data are similar to those observed in clinical trials
- Repeated national registries and audit are useful tools in monitoring the change in therapy and outcomes in clinical practice

Outcome

Of the 212 patients in the cohort we had acute and six-month outcome data for 207 patients and mortality data for 209. Three patients (1.4%) suffered a clinically overt MI as a consequence of the intervention. For the whole cohort the event rate up to six months was: CABG 2.4%, repeat PCI 4.9%, hospitalisation 17%, MI 1.5%, waiting list for revascularisation 1.9% and death 2.9%. The composite death and MI rate at six months was 5.8%.

We also looked at outcomes in a subgroup of 101 patients with high risk – diabetics, patients with ST segment depression and those over 70 years of age – and observed that they had worse outcomes. In this high-risk group 3% suffered a clinically overt MI as a consequence of the procedure, while the six-month event rate was: CABG 0%, repeat PCI 4%, hospitalisation 18.2%, MI 2%, waiting list for revascularisation 3% and death 6%. The composite death and MI rate at six months was 11%.

Our data show acceptable outcomes for acute intervention in unstable angina and NSTEMI. In comparison to PRAIS-UK, the mean age of our cohort was lower. However, the patients who received PCI in PRAIS-UK were younger than the average for the rest of that cohort. Our six-month composite rate of death and MI was lower than that observed in PRAIS-UK. This is a reflection of the fact that only 10% and 4% of the PRAIS-UK cohort had angiography and PCI, respectively, during the initial hospital admission while in our cohort all patients underwent PCI during the initial admission, with high rates of stenting and use of abciximab.

To our knowledge there are no other published data on UK six-month outcomes for PCI in unstable angina and NSTEMI. The only other source of similar UK data comes from the British Cardiac Intervention Society (BCIS) audit. However, this reports periprocedural outcomes on combined elective and acute PCI: it has no information on six-month outcomes and no data on

patient characteristics such as age, ECG characteristics, and troponin status. For the year 2001 the BCIS reports a periprocedural MI rate, for 26 cardiac centres (20,168 patients), of 0.7% and a death rate of 1% (range 0–2.8%).

Our audit also shows that the time delay between admission and intervention can be kept to a reasonable level. Mechanisms for achieving this are multifactorial and include dedicated acute lists, an interventional coordinator and ring-fenced beds, and same-day transfer between district general hospitals and the regional centre.

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