SIR—Population demographics in industrialised nations predict an increase in octogenarian patients. Poor outcomes following coronary intervention have led researchers to question the role of such procedures in this population [1]. Elderly patients undergoing revascularisation are more likely to present with complex lesions and associated co-morbid conditions [2].

Although the effects of cardiovascular therapies on morbidity and mortality have been reported [3–5], there is paucity of data on quality of life following percutaneous coronary revascularisation (PCR) in octogenarians. We recorded both clinical outcomes and quality of life in octogenarians at 6 and 12 months after PCR.

Methods

Seventy-four consecutive patients aged ≥80 years undergoing PCR were recruited over 18 months and prospectively studied. Local ethics committee approval was obtained.

No patients underwent more than two-vessel revascularisation, 28 patients underwent two-vessel revascularisation and the remainder underwent single vessel only.

SF 36

We obtained data for the eight scales and the physical and mental health summary scales [6, 7]. The summary scales were compared to normative data for the general population, age >75 years in the USA [7, 8]. The data from the eight individual scales were compared to the normative data from the UK population [9].

Seattle angina questionnaire (SAQ)

The SAQ is a validated, self-administered, disease-specific measure for patients with coronary artery disease [10, 11].

The physical limitation and angina frequency scores were classified as minimal (scores 75–100), mild (50–74), moderate (25–49) and severe (0–24). Severe angina reflects episodes several times per day, moderate angina several times per week to every day, mild angina reflects weekly occurrence and minimal angina occurs less than once a week or not at all. Angina stability scores were classified as much better (76–100), slightly better (51–75), unchanged (50), slightly worse (25–49) and much worse (0–24). Treatment satisfaction score was categorised as mostly to completely satisfied (75–100), somewhat to mostly satisfied (50–74) and somewhat dissatisfied to not satisfied at all (0–49). Quality-of-life scores were classified as excellent (75–100), good (50–74), fair (25–49) and poor (0–24) [12, 13].

Analysis of time trends in outcome measures

Both raw SF-36 and SAQ scores were analysed in the same way. Longitudinal analysis of each of the standard subscale scores served as the dependent variable in a hierarchical linear model incorporating indicators for the three time periods (baseline, 6 and 12 months) as well as a random effect for each patient. Because of the limited size of the data set, we did not adjust the model for any person specific covariates nor test for covariate effects.
Statistical method (see Appendix 1 for detailed description available at Age and Ageing online)

Our hypothesis was that outcomes improve following PCR, and that improvements are sustained. UK population norms in broad age groups were provided for the SF-36 subscales. The differences between the subject’s observed scores and the corresponding norms were calculated at 6 and 12 months.

We explored the pattern of missing data and observed no associations between missingness of response at any time with the observed responses at other times, consistent with the outcome data being missing at random.

Calculations were performed using Stata version 10.1 MP (Stata Corp., TX, USA).

Results

The demographic and clinical details are shown in Appendix 2 (available at Age and Ageing online). Of 74 patients (mean age 82.5 ± 2.3 years), 61 patients had multi-vessel disease with 28 undergoing two-vessel PCR (no patient underwent more than two-vessel PCR).

Complications during hospitalisation were as follows: three patients developed groin haematoma delaying hospital discharge, one patient presented with self-limiting haematemesis not requiring transfusion, one patient had postural related vasovagal syncope not requiring pharmacological intervention, two patients developed pulmonary oedema which was successfully treated and one patient required emergency coronary artery surgery. All patients were discharged home and the mean hospital stay was 1.8 days.

Over 12 months, 14 patients were readmitted with angina (3 underwent repeat PCR, 11 treated medically) and 3 died.

SF-36

As Table 1 shows, the physical and mental summary scales as well as Role Limitation-Physical, Bodily Pain, and Role Limitation-Emotional all exhibited significant improvement over baseline at 6 months. Furthermore, all of these gains were sustained at 12 months. The remaining SF-36 subscales did not differ significantly between baseline and 6 or 12 months.

Six and 12 months after PCR all SF-36 scales were lower than corresponding age UK normative data, except for physical and mental summary scales (see Appendix 3 available at Age and Ageing online).

SAQ

Wesee from Table 1 that all five subscales of the SAQ exhibited significant improvement between baseline and 6 months, with the gains being sustained out to 12 months.

At 6 months 90% of patients had little or no angina (Table 2). At 12 months 80% of patients had little or no angina. The mean physical limitation scores were 42.3 and 41.4 at 6 and 12 months respectively, suggestive of only mild limitation with angina. The mean treatment satisfac-

Discussion

Octogenarian patients undergoing PCR were found to have functional status and quality of life lower than norms at 6 and 12 months, but substantially improved over baseline. Of note, many patients with multi-vessel disease underwent single, culprit vessel angioplasty. Two aspects of this study differentiate it from others: (1) a majority of patients presented with an acute coronary syndrome and (2) we performed both angina and functional status assessments to 12 months.

In addition to maintained quality of life, the safety of PCR in this high-risk population was confirmed. Studies have reported a mortality of 7–10% [14, 15] after elective PCR in the elderly and our result (in a high risk group) compares favourably. Of interest is that following successful PCR, patients’ average length of hospital stay was <2 days. This is of particular interest in this population as prolonged bed rest and hospitalisation are associated with morbidity.

A majority of patients underwent single (culprit vessel, as identified by the operator) revascularisation. The successful outcome of this ad hoc approach was encouraging given the potential for complications from adjunctive therapy (contrast nephropathy, antithrombotics) and prolonged procedure times in the elderly. The role of culprit vessel revascularisation is unknown in this population, but our results provide a basis for further study.

The measurement of health status has become important for assessing outcomes of patients with coronary artery disease. There is recognition that mortality should not be the sole measure of outcome in octogenarians. Increasingly, purchasers of health care assess treatment benefits based on quality of life years gained in addition to lives saved [16, 17].

Generic questionnaires (e.g. SF-36) are widely used in patients with angina. They have potential to capture the wider effects of interventions and take the effect of co-morbidity on health. Disease specific instruments (e.g. SAQ) are more relevant to assess quality of life directly in the presence of coronary artery disease [10].

The QoL scores after PCR improved significantly from baseline. The findings at 6 months persisted to 12 months with 80% of patients having little or no angina and highly satisfied with their treatment. Although symptom relief is the goal following PCR, the presence of residual angina affects other aspects of daily life by impinging on an individual’s independent status. Factors such as energy and vitality, emotional and social functioning are of paramount importance in an elderly population and can be adversely affected by chronic angina. Our study reveals that PCR results in symptom relief and in improved quality-of-life measures. It is not surprising that the SF-36 subscale scores did not rise fully to the level of population norms. Those norms are derived from healthy people who often have other vascular and
### Table 1. SF-36 and SAQ subscales

<table>
<thead>
<tr>
<th>Time</th>
<th>Physical functioning</th>
<th>Role limitation—physical*</th>
<th>Bodily pain*</th>
<th>General health perceptions</th>
<th>Energy and vitality</th>
<th>Social functioning</th>
<th>Role limitation emotional*</th>
<th>Mental health</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>32.3</td>
<td>7.9</td>
<td>40.1</td>
<td>49.2</td>
<td>34.0</td>
<td>53.1</td>
<td>35.8</td>
<td>67.1</td>
</tr>
<tr>
<td>6 months</td>
<td>44.5</td>
<td>33.8</td>
<td>61.6</td>
<td>50.1</td>
<td>42.7</td>
<td>72.0</td>
<td>57.3</td>
<td>71.0</td>
</tr>
<tr>
<td>12 months</td>
<td>43.2</td>
<td>38.7</td>
<td>58.4</td>
<td>47.7</td>
<td>40.1</td>
<td>68.0</td>
<td>62.3</td>
<td>70.1</td>
</tr>
</tbody>
</table>

*Statistically significant (P < 0.05) difference baseline versus 6 and 12 months.

Modelled mean scores and 95% confidence intervals for each of the SF-36 and SAQ subscales at baseline, 6 months and 12 months of follow-up.

### Table 2. SAQ assessment of angina frequency

<table>
<thead>
<tr>
<th>Angina frequency</th>
<th>6 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everyday</td>
<td>10%</td>
<td>18%</td>
</tr>
<tr>
<td>Once a week</td>
<td>12%</td>
<td>35%</td>
</tr>
<tr>
<td>Once a month</td>
<td>38%</td>
<td>11%</td>
</tr>
<tr>
<td>No angina</td>
<td>40%</td>
<td>36%</td>
</tr>
</tbody>
</table>

non-vascular diseases (not affected by PCR) to impair quality of life.

Our findings are consistent with previous studies which have shown significant improvement in QoL after PCR in elderly patients (>70 years) [18–22]. Previous studies in octogenarians have used either the SF-36 [19] or SAQ [20, 21]. We used both SF-36 and SAQ and noted improvement not only in symptoms of angina but also in general health status. Whereas most studies of elderly patients have observed only those with stable angina, our study included a majority with an index presentation of acute coronary syndrome. The risks associated with revascularisation following acute coronary syndromes are greater [23].

In our study, a significant proportion of patients had multi-vessel disease and although most had only target vessel revascularisation, a significant improvement in QoL was noted with benefit sustained to 12 months.

With population demographics in industrialised nations showing an increased and increasing prevalence of elderly patients, the efficacy of medical and invasive treatments in this cohort is unknown. Large randomised controlled trials largely ignore this group. Our study demonstrates that culprit vessel PCR in octogenarians is effective in improving both symptom and quality of life measures and provides evidence for large-scale trials in this population.

### Limitations

Our group was not a random sample of the octogenarian population, and we have no untreated, or medically treated, control group for comparison.

### Key points

- Octogenarians benefit from culprit vessel PCR.
- PCR in the elderly is safe.
- Octogenarians have improved quality of life after PCR.
**Funding**

This study (Dr Zaman) was supported by a Clinical Research Fellowship from the British Heart Foundation (Grant number, FS/07/33).

**Supplementary data**

Supplementary data are available at *Age and Ageing* online.

**References**


Quality of life of elderly people on warfarin for atrial fibrillation

**SIR**—Atrial fibrillation/flutter (AF) predisposes to ischaemic stroke and is associated with greater disability and mortality than those without AF [1]. The prevalence of AF rises with age and increases sharply in older people [2]. In one study, AF accounted for 10–15% of ischaemic strokes in younger people and nearly 25% in people aged over 80 years [3]. Therapeutic oral anticoagulation with international normalized ratio (INR) of 2–3 is well established both for primary and secondary stroke prevention. This confers an additional 40% risk reduction in recurrent stroke compared with antiplatelet therapy [4]. Furthermore, recent evidence suggests that this may also be associated with reduced stroke severity [5] and overall mortality [6] in patients with ischaemic stroke due to AF.