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An observational study of co-morbidities in male Caucasian and South Asian sub-populations with acute coronary syndrome

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ABSTRACT

Background: Acute coronary syndromes (ACS) are one of the most common presentations to secondary care. In addition to established co-morbidities, ethnicity appears to play a significant role with South Asians deemed to be at particular risk.
Methods: An observational, retrospective study was performed to compare prevalence and management of co-morbidities in male South Asian versus Caucasian populations presenting with ACS. 225 patients were included.
Results: Prevalence of smoking, pre-existing hypertension and hyperlipidaemia was similar. Compliance with ACE-inhibitors/ARB, beta-blockers and high-dose statins also appeared to be comparable. South Asians demonstrated a higher prevalence of type 2 diabetes mellitus (DM) compared with Caucasians (43% versus 19%, $p = 0.003$), in correlation with higher average BMI (26.3 versus 22.6, $p = 0.019$). Requirements for ≥1 oral hypoglycaemic (12% versus 3%, $p = 0.030$) and insulin therapy (9% versus 4%, $p = 0.045$) was greater. South Asians also demonstrated poorer glycaemic control as defined by HbA1c >48 mM (79% versus 58%, $p = 0.004$).
Conclusions: Results from this study advocate a particular need to monitor glycaemic control in South Asian subgroups, who demonstrate preponderance towards type 2 DM. Cultural and language barriers may account for this disparity and require particular focus.

1. Introduction

Acute coronary syndromes (ACS) pose a significant global health burden. Recent estimates suggest direct healthcare expenditure and economic loss related to ACS amounts to £3.6 billion annually in the UK, whilst the burden to society is valued at up to £9.8 billion [1]. ACS is an umbrella term and encompasses ST-elevation myocardial infarction (STEMI), non ST-elevation myocardial infarction (NSTEMI) and unstable angina (UA). These present as acute episodes, with subsequent management including percutaneous coronary intervention, coronary artery bypass grafting or pharmacological therapy alone [2]. Despite such measures, the risk of recurrence of symptoms or complications from the primary event remains. Subsequent emphasis should therefore be placed on secondary prevention for patients with ACS.

In the UK, NICE (National Institute of Clinical Excellence) suggest a multi-faceted framework for secondary prevention in patients presenting with ACS [3]. Initiation of pharmacological therapy is advocated and includes dual anti-platelet therapy, angiotensin blockade, beta-blockers and high dose statins (atorvastatin 80 mg OD or simvastatin 80 mg ON). Lifestyle modifications include advice to adopt a Mediterranean-style diet and consumption of omega 3 fatty acids to improve lipid profile. Moderate alcohol consumption within appropriate limits and a regular daily physical activity for the duration of at least 20–30 min is encouraged. Smoking cessation therapy and weight control is emphasised and options to implement strategies in the primary care setting are outlined. Other modifiable risk factors include hypertension and diabetes, and management of these often form the cornerstone of measures for secondary prevention.

Prevalence of coronary events amongst first-generation migrants from South Asia is deemed to be higher than those from white majority populations [4–6]. Bradford has the highest density of South Asians per capita in the UK at 20.3%, predominantly originating from Pakistan [7]. Bradford Royal Infirmary (BRI) is the largest district general hospital within the area that sub-serves this population. This study therefore sought to compare prevalence and management of co-morbidities in Caucasian and South Asian sub-populations presenting to BRI with ACS. It has been commonly observed that sex-based differences in characteristics in such patients exist in any ethnicity and it is often desirable to analyse men and women separately. For this reason, the study focused on male subjects only.

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2. Methods

Between March 2012 and September 2013, male patients were identified retrospectively from those presenting to a specialist nurse-led clinic six weeks post-admission with ACS. All patients had this arranged on discharge as a routine follow-up appointment. Electronic clinic letters and medical notes were scrutinised for data on demographics, biochemical profiles and physiological parameters. Biochemical profiles were verified using the hospital laboratory result server.

All presentations with acute coronary syndrome that were managed at BRI were included in the study, irrespective of the hospital where intervention occurred, if at all. Patients were excluded if letters or medical notes were absent or not retrievable within a reasonable time period. For readmissions, only the initial presentation was included in the analysis. Caucasians were defined as those of European descent. South Asians were defined as those whose ancestry originated from the Indian subcontinent (India, Bangladesh, Sri Lanka or Pakistan).

The study was approved by Bradford Royal Infirmary Audit Committee (ID3328). Consent was not formally obtained as patient records and information was anonymised and de-identified prior to analysis. Data was collated using Microsoft Excel 2012. Statistical analyses were performed using Minitab 16. Dichotomous variables were compared using the chi-squared test. A two-sample *t* test was performed to assess for differences in means. Statistical significance was defined by $p < 0.05$.

3. Results

3.1. Demographics

238 patients were identified from the initial retrospective electronic search. Correspondence was not retrievable in 6 cases. There were 4 cases of readmission and 3 deaths prior to clinic review. Overall, 225 patients were eligible for inclusion. Demographics of the study groups are summarised in Table 1. 63% (142/225) were Caucasian and 37% (83/225) Asian, with similar age distributions (Caucasians: 66.1 years [SD 12.14], Asians: 64.6 years [SD 12.62], $p = 0.112$). Proportions of STEMI compared to NSTEMI were as follows: Caucasians (57% [81/142] vs 43% [61/142]), Asians (43% [36/83] vs 57% [47/83]). Prevalence of current smokers was comparable (43% [61/142] vs 37% [31/83], $p = 0.328$). The presence of pre-existing hypertension (57% [81/142] vs 59% [49/83], $p = 0.489$) was also similar.

3.2. Glycaemic control

Risk factor profiles for both sub-populations are outlined in Table 2. The prevalence of diabetes mellitus (DM), defined as 2 h plasma glucose ≥11.1 mmol/L or fasting plasma glucose ≥7.0 mmol/L, was significantly higher in Asians (43%) than Caucasians (19%) with a difference of 24%; 95% CI: 6-35%, $p = 0.003$. Patients predominantly had DM type 2, with only two Caucasians having DM type 1. More Asians were on ≥1 oral hypoglycaemic than Caucasians (12% [10/83] vs 3% [4/142], $p = 0.030$). 9% (7/83) of Asians were on insulin compared to 4% (6/142) of Caucasians, a difference of 5%; 95% CI: 0.1–12%; $p = 0.045$. With one exception, all patients on insulin had been reviewed by the in-reach diabetes service prior to discharge. At admission, glycaemic control was suboptimal in both groups. 79% of Asians compared with 58% of Caucasians had a HbA1c >48 mmol/L, a difference of 21%; 95% CI: 6–48%, $p = 0.004$. Mean HbA1c was 62 mmol/L [SD 11.20] in Asians and 54 mmol/L [SD 14.38] in Caucasians, $p = 0.103$.

Table 1
Demographics of study groups.

	Caucasians (n = 142)	Asians (n = 83)	p-Value
Age (mean)	66.1	64.6	0.112
FHx of CAD	15	18	0.501
Diabetes mellitus (%)	19	43	0.003
Hypertension (%)	57	59	0.489
Current smoker (%)	43	37	0.328
STEMI (%)	57	43	0.172
NSTEMI (%)	43	57	0.200

Table 2
Risk factor profiles of Caucasian and South Asian sub-populations.

	Caucasians (n = 142)	South Asians (n = 83)	p-Value
Glycaemic control			
Mean HbAlc (mM)	54	62	0.103
HbA1c > 48 mM (%)	58	79	0.004
≥1 Oral hypoglycaemic (%)	3	12	0.030
Insulin therapy (%)	4	9	0.045
Physiological parameters			
Mean systolic BP (mm Hg)	130	131	0.237
Mean diastolic BP (mm Hg)	71	74	0.257
BP ≥ 140/90 at follow-up (%)	30	33	0.456
ACE-i/ARB therapy (%)	95	93	0.532
Uptitration of ACE-i/ARB therapy (%)	63	64	0.992
Rate-limiting therapy (%)	97	94	0.440
Resting HR ≤ 60 bpm (%)	45	49	0.264
Lipid profile			
Total cholesterol > 4 mM (%)	17	11	0.109
LDL-cholesterol > 2 mM (%)	13	9	0.041
HDL-cholesterol < 1 mM (%)	68	77	0.101
Triglycerides > 2 mM (%)	30	33	0.542
High-dose statin (%)	95	94	0.532
Mean weight (kg)	69.5	76.2	0.013
Mean BMI	22.6	26.3	0.019

3.3. Physiological parameters (BP and HR)

At follow-up, 30% (43/142) of Caucasians and 33% (27/83) of Asians had uncontrolled blood pressure (BP ≥140/90), a difference of 3% (95% CI: −0.06–16%, $p = 0.456$). Mean systolic and diastolic BP was similar (130 vs 131, $p = 0.237$; 71 vs 74, $p = 0.257$). There was no difference in terms of angiotensin blockade between ethnic groups. 135/142 (95%) of Caucasians were on an angiotensin converting enzyme inhibitor (ACE-i) or angiotensin receptor blocker (ARB), and of these 89/135 (66%) were suitably uptitrated (minimum doubling of dose) with consideration of BP and renal function. Similarly, 77/83 (93%) of Asians were on an ACE/ARB, and of these, 53/77 (69%) were suitably uptitrated. 97% (138/142) of Caucasians were on rate-limiting therapy (beta-blocker: 92% [127/138], ivabradine: 8% [11/138]), and in this group, 46% (64/138) had a heart rate (HR) ≤60 beats per minute (bpm). In comparison, 94% of Asians (78/83) were on rate-limiting therapy (beta-blocker: 97% [76/78], ivabradine: 3% [2/78]) and 53% of these (41/78) had a resting HR ≤60 bpm.

3.4. Lipid profile

Target values for lipid profile were defined by UK NICE guidelines [3]. 17% (24/142) of Caucasians had total cholesterol >4 mmol/L compared to 11% (9/83) of Asians ($p = 0.109$). 13% (18/142) of Caucasians had LDL >2 mmol/L compared with 9% (7/83) of Asians ($p = 0.041$). HDL <1 mmol/L was present in 68% (97/142) of Caucasians, versus 77% (64/83) of Asians ($p = 0.101$). Assessment of triglyceride levels revealed no difference in those with values >2 mmol/L (30% [43/142] vs 33% [27/83], $p = 0.542$). Compliance with high-dose statin therapy was excellent in both groups (95% [135/142] vs 94% [78/83], $p = 0.532$). Only one patient was reported to have discontinued therapy because of an adverse side-effect. Mean weight in Caucasians was 69.5 kg compared to 76.2 kg in Asians ($p = 0.013$). Similarly, average BMI was 22.6 ("normal") in Caucasians and 26.3 ("overweight") in Asians, a statistically significant difference ($p = 0.019$).