Non-traumatic chest pain in young adults: a medical audit

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SUMMARY

Four hundred consecutive young patients who attended an accident and emergency department with non-traumatic chest pain as their primary complaint were reviewed. They represented 0.7% of total new attendances. Most were self-referrals, but ambulance transport was requested for over 25%. The majority of investigations (mainly chest radiography and electrocardiography) performed in this group of patients were normal; however, almost one in six investigations was judged to be abnormal. Although this group of patients is at low risk for serious cardiorespiratory disease, a small but significant number of underlying (mainly non-cardiac) disorders was found and 22.5% (90) required in-patient admission. In contrast, almost one-fifth of patients received no specific diagnosis, while almost 40% were deemed to require no follow-up.

INTRODUCTION

In the current climate of health politics, economics and litigation, it would seem logical to concentrate on the medical and fiscal management of problems in clinical practice that are at once common and expensive to deal with (Plotnick & Fishes, 1985). Such problems may be characterized by means of Internal Audit, which looks at a group of patients sharing some characteristic (Shaw, 1980). Chest pain of spontaneous onset is a frequent reason for presentation to accident and emergency departments (Lee et al., 1985; Rouan et al., 1987). Although the vast majority of patients with non-traumatic chest pain have no serious underlying pathology, many are extensively investigated and/or are hospitalized, primarily because of physicians' anxiety lest they miss important but subclinical cardiac events. (Brush et al., 1985; Plotnick & Fisher, 1985). Previous studies into non-traumatic chest pain have focused on patients that are at risk from ischaemic heart disease and that are generally over 35 years of age or more (Pozen et al., 1984). Few studies,
however, have examined the clinical problem of young adults who present to accident and emergency departments with spontaneous chest pain. Accordingly, we conducted an audit of such patients attending our department to define the extent of the problem and highlight areas for possible future investigation.

MATERIALS AND METHODS

The Accident and Emergency Department records of four hundred consecutive patients, between the ages of 13 and 35 years inclusive, noted to have chest pain or Chest Pain Equivalent as a primary presenting complaint were retrospectively reviewed. Chest Pain Equivalent (Hoffman & Igarashi, 1985) is defined as a primary complaint, other than chest pain, suggesting an intrathoracic aetiology, e.g. jaw pain in ischaemic heart disease.

A record was made of the following data: the source of referral, the means of transport to the department, the clinician primarily responsible for the patient’s management, the final working diagnosis in the department, the disposal for each patient, the number of investigations performed per patient and whether the investigations were normal or abnormal. Data were collated with an Amstrad 1540 Personal Computer, using a simple database. The Accident and Emergency Department of the Royal Infirmary of Edinburgh is a regional and academic unit, receiving 70 000 new patients annually. In general, except in cases of dire emergency, children under the age of 13 years are seen in the nearby Royal Hospital for Sick Children. The catchment area is primarily urban, but a considerable number of patients are referred to the department from 4 outlying hospitals within a 20 mile radius.

RESULTS

The four hundred patients included in the audit attended between the 1st of February 1987 and the 7th of November 1987. During this period 55 756 new patients attended the department. This group therefore represents 0.7% of all new attendances. Two hundred and sixty-seven were male and 133 were female; the male: female ratio was 2:1. Table 1 shows the sources of referral of these patients as well as their means of transport to the department.

The diagnoses made in the department were grouped in 8 broad categories (Table 2). Almost half (46%) of the working diagnoses were of musculoskeletal disorders (29%) or were not specified (17%), i.e. no firm diagnosis was made on the chart. Twenty-seven (7%) of all patients had myocardial ischaemia (diagnoses by clinical and/or ECG criteria and accepted from the records for the purposes of the audit), while 5% (19) had a pneumothorax. A total of 94% of all the patients were seen by a Senior House Officer and/or a Registrar and Table 3 compares the diagnostic categories found in those patients who were initially seen by a SHO or Registrar (with or without referral to another physician). The only significant difference between the SHOs’ and Registrars’ diagnostic classification was in the ‘psychogenic’ group (4% compared with 8% respectively).
Table 1. Source of referral and means of transport.

<table>
<thead>
<tr>
<th></th>
<th>999</th>
<th>OTHER</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP</td>
<td>36</td>
<td>80</td>
<td>116</td>
</tr>
<tr>
<td>SELF</td>
<td>67</td>
<td>188</td>
<td>255</td>
</tr>
<tr>
<td>OTHER</td>
<td>4</td>
<td>25</td>
<td>29</td>
</tr>
<tr>
<td>TOTALS</td>
<td>107</td>
<td>293</td>
<td>400</td>
</tr>
</tbody>
</table>

Table 2. Diagnostic categories.

<table>
<thead>
<tr>
<th>Category</th>
<th>No. Patients</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial Ischaemia</td>
<td>27</td>
<td>7</td>
</tr>
<tr>
<td>Pneumothorax</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Respiratory infection</td>
<td>43</td>
<td>11</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>33</td>
<td>8</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>116</td>
<td>29</td>
</tr>
<tr>
<td>Psychogenic</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>72</td>
<td>17</td>
</tr>
<tr>
<td>Not specified</td>
<td>68</td>
<td>17</td>
</tr>
<tr>
<td>TOTALS</td>
<td>400</td>
<td>100%</td>
</tr>
</tbody>
</table>

A total of 606 investigations were performed in the Accident and Emergency Department: these were mainly chest radiographs and electrocardiograms but also included arterial blood gas analysis, full blood counts, electrolyte levels and urinalysis. The numbers of normal and abnormal investigations are displayed in Table 4. It was noted, in comparing those investigations performed in patients seen by SHOs or Registrars, that there were equal numbers of normal and abnormal investigations i.e., 84% of ECGs and 85% of chest X-rays were normal in each group. However, in patients who required admission, 37% of chest X-rays and 43% of ECGs were noted to be abnormal. Table 5 illustrates the number of investigations performed in those patients that were admitted or discharged.
A total of 22.5% of patients (90) were admitted; of those 210 patients discharged from the department, 28.5% were referred to their GP for follow-up, 11.25% were referred to another hospital or clinic for outpatient assessment, while 37.75% were unconditionally discharged from the department with no follow-up being arranged.

DISCUSSION

Acute non-traumatic chest pain in all age groups is the reason for about 2% of all attendances in accident and emergency departments (Rouan et al., 1987). Thirty to fifty-eight percent of patients over the age of 30 years with acute chest pain are hospitalized (Lee et al., 1987; Rouan et al., 1987). The vast majority of these are to ‘rule out’ acute myocardial infarction (AMI). Such liberal admission policies are supported by the awareness among physicians and the public of cardiovascular disorders, which continue to account for most deaths in men and women over the age of 35 years (Rouan et al., 1987). Although the number of patients with AMI inadvertently sent home each year from Accident and Emergency departments each year is small (probably between 1–5%) (Editorial, The Lancet, 1987; Lee et al., 1987; Rouan et al., 1987) and few such discharged patients succumb before their real condition is identified (Lee et al., 1987), failure to diagnose AMI remains one of the greatest pitfalls in accident and emergency practice (viz. it accounts for about 20% of compensation payments in American malpractice litigation, see Zarling & Sexton, 1983).

To compound the problem, while chest pain is associated with up to two-thirds of AMI (Alonzo & Simon, 1975), 30% of these patients have an atypical or painless presentation. Nevertheless, long-term survival for patients in whom the diagnosis

| Table 4. Investigations performed in the A&E Department. |
|---------------------------------|--------------|--------------|----------------|
| Normal                         | Abnormal     | Totals       |
| CXR 265 (c.85%)                 | 47           | 312          |
| ECG 188 (c.84%)                 | 35           | 223          |
| ABGs* 19 (c.66%)                | 10           | 29           |
| Others 36 (c.87%)               | 6            | 42           |

* = Arterial Blood Gases

| Table 5. Investigations relating to disposal. |
|-----------------------------------------------|--------------|----------------|
| Admitted                                      | Discharged   | Totals         |
| CXR 73                                        | 239          | 312            |
| ECG 54                                        | 169          | 223            |
| ABGs* 10                                      | 19           | 29             |
| Other 12                                      | 30           | 42             |

* = Arterial Blood Gases
is unrecognized is the same as for those whose AMI is initially identified (Kannel & Abbot, 1984). It is surprising then to find such a high rate of admission (nearly a quarter) for young patients with spontaneous chest pain. Although chest radiography and electrocardiography were performed in over 75% and 50% respectively of these cases with one or more further tests performed in about 17% (71), it is perhaps less surprising that the vast majority of these were interpreted as normal. Anxiety about chest pain, it seems, has extended to the younger, presumably healthier, public and in turn to their attending doctors. The relatively large numbers of young patients presenting to the Accident and Emergency Department with non-traumatic chest pain and the large proportions that are investigated and admitted prompt a closer look at aetiologies and economic implications.

Ischaemic heart disease was deemed to be present in 7% of these young patients. However, the cause of spontaneous chest pain in the majority of the patients remains unclear. No diagnostic conclusion was reached in 17%, while a vague musculoskeletal aetiology was attached to about 30%: truly idiopathic or 'Benign Thoracic Pain' probably accounts for most of these, especially in adolescents (Rowland & Richards, 1986). Nevertheless, given that nearly 30% of these young patients had so-called musculoskeletal disorders, there is clearly a need for better understanding of such conditions e.g. costosternal syndrome, slipping rib, xiphodynia etc. Equally 'catch-all' diagnoses such as Tietze's syndrome or Bornholm's disease should not be entertained without justification (Rowland & Richards, 1986).

The 4–8% of cases in this audit with 'psychogenic' chest pain are almost certainly under representative; presumably a 'functional' cause was imputed to many of the cases where firm diagnoses went unrecorded. Other studies have shown that psychogenic regional chest pain and panic disorders are far commoner that is generally realized (Beitman et al., 1987; Fam & Smythe, 1985).

Up to one third of chest pain patients in cardiology clinics have angiographically normal coronary arteries, while chest pain may be a recurrent symptom in up to 60% of certain psychiatric populations (Beitman et al., 1987). Panic disorder has been found particularly in younger women with recurrent atypical chest pain and with few risks for coronary disease. Mitral valve prolapse is a reputedly common associated finding or cause for atypical chest pain, although seldom detected clinically, as in this audit (Tomb & Christensen, 1987; Levine, 1980). It may be that psychiatric evaluation should be considered in all cases of recurrent 'idiopathic' or 'Benign Thoracic Pain' identified in the accident and emergency department.

Although costly, investigations in cases of chest pain may be indispensable; despite limitations, an ECG remains the most useful and practical adjunct to careful clinical assessment in detecting an AMI (Hoffman & Igashi, 1985; Lee et al., 1985) while a chest X-ray may identify clinically unidentified but potentially dangerous conditions such as pneumomediastinum or small pneumothorax (Luke et al., 1987; Clinton et al., 1986). Indeed, negative investigations may afford considerable and therapeutic reassurance to patients with chest pain and may thus be cost-saving in the long term (Sox et al., 1981).

The findings of this audit suggest a need to reconsider the problem of chest pain in young patients attending accident and emergency departments; a Chest Pain
Follow-up Clinic has been found to be useful in managing higher-risk, older patients (Plotnick & Fisher, 1985; Rouan et al., 1987) and similar clinics may prove helpful with younger patients. Evidently, it is desirable that prospective studies into the management of young adults with chest pain be carried out, in order to describe clearer criteria for investigation by radiography and electrocardiography and other tests. It may then be possible for protocols to be set down for the management of this substantial problem in the accident and emergency department.

REFERENCES


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