Commentary: Pattern recognition versus bayesian approach for diagnosis in primary care

John Fletcher, Robin Fox

Our first thought on reading this case was, “That's just too unusual. We can't possibly send every 28 year old woman with a bit of chest pain off for echocardiography.” In thinking that, we were using pattern recognition—a common approach to clinical diagnosis. We assumed that a young woman could not have noteworthy ischaemic heart disease.

But is there more to this case? If we were to substitute a 28 year old woman for a 50 year old man in the same scenario, most clinicians would recognise a familiar clinical pattern and put ischaemic heart disease high on the list of possible causes of “exertional chest pain relieved by rest.” Clinicians interpret symptoms in the light of what they believe are the possible diagnoses for the patient sitting in front of them. Thus ischaemic heart disease is high on the list for older men and low on the list for younger women. But are age and sex good enough predictors of ischaemic heart disease to safely rule in or rule out the diagnosis in a consultation in primary care? Clearly in this case they were not.

Bayesian approach

A bayesian approach to the problem would use all relevant information about the patient to estimate the prior probability of disease before interpreting the history. Mrs Patel is probably at increased risk because of her ethnicity, diabetes, and high body mass index. Each of these factors alone carries a relative risk for ischaemic heart disease of between 1.5 and 3.5, outweighing the advantages of female sex and youth.

Even before we consider her symptoms, Mrs Patel has about the same cardiovascular risk as, say, a middle aged white man with no other risk factors. Using this bayesian approach to diagnosis we were less surprised that her chest pain turned out to be angina.

In the average time that a general practitioner has to assess chest pain he or she has to make a decision—to reassure the patient or to refer to a hospital. How easy is it to persuade the local rapid access chest pain service to accept a 28 year old woman? How long will a cardiology referral take to come through? Is admission justified or would it unnecessarily frighten the patient and generate unnecessary costs? Unfortunately, we have no simple tests sensitive enough to safely rule out angina, which often means that referral is necessary.

Pattern recognition serves us well when patients fit the pattern. However, Mrs Patel did not fit a common pattern and our first reaction was wrong. In atypical cases with multiple risk factors we need a more systematic bayesian approach.

JF is the BMJs primary care editor.

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Commentary: Diagnosing chest pain in general practice

Neil C Campbell

As is often the case, Mrs Patel, a 28 year old woman, presented with chest pain first to her general practitioner.1 Chest pain is a common presentation in general practice in all age groups, and often difficult to diagnose precisely. More often we attempt to exclude certain diagnoses—not only coronary heart disease but also pulmonary embolism, embolism, pneumothorax, and cancer. Most of these have been mentioned in the rapid responses.2

The case progression shows the difficulties that even cardiologists, with extensive hospital resources, have in reaching a clear diagnosis. For the general practitioner, things are even more difficult: the presentation is usually at an earlier stage, symptoms are less specific, and the patient can be lost among the many with benign causes.

Most research on diagnosing chest pain has been hospital based, where caseload is quite different and investigations more readily available. General practitioners continue to rely on descriptions of symptoms, consideration of underlying risk, and clinical judgment, sometimes helped by an electrocardiogram.3 We have some advantages over our hospital colleagues: we should know more about her family history, we can watch symptoms settle or progress (as they did here), and we know more about the patient's social circumstances.

Context

Social circumstances are important. For myself, in a part of rural Aberdeen, it is almost unheard of for a 28 year old woman to develop coronary heart disease. Yes, she has diabetes and obesity, but her diabetes is well controlled and obesity is common. She has normal blood pressure, a commonplace cholesterol concentration, and she has never smoked. Her
hypothyroidism is an important distraction and a possible cause of various symptoms, perhaps including the chest pain.

In Scotland (population about 5 million), only 258 women under 45 had coronary heart disease diagnosed in 2004.4 If these women were evenly distributed, an average general practitioner would only see one presentation every 20 years or so. But they are not evenly distributed. I have colleagues from parts of Glasgow who would not in the least be surprised by the correct diagnosis. The likelihood of coronary heart disease is much higher in deprived communities, independent of traditional risk factors.5 For general practitioners in different places, our experiences—and consequent diagnostic practices—are quite different.

We don’t know how Mrs Patel’s general practitioner responded to her chest pain and hypothyroidism. We know she received treatment for a presumed musculoskeletal cause, but I wonder if her thyroxine treatment was cautious (25 μg is an unusually low dose) because coronary heart disease was also being considered.

Not unusually, Mrs Patel re-presented with chest pain six months after angioplasty. A clinical diagnosis is now even more difficult. Even for “experienced” angina patients, it can be impossible to differentiate types of chest pain, causing some patients disabling anxiety and others to delay presentation with critical ischaemia. This time the pain was not related to exertion and, thankfully, investigations were normal.

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Lesson of the week
Parental suicide after the expected death of a child at home
Dawn E Davies

Doctors prescribe opioids and other controlled drugs to make patients in a variety of states of disease more comfortable. Once in the community, these drugs are not monitored or audited, and patients and their families are responsible for handling them safely. Recently, end of life care has received greater international attention, and the field of palliative care is emerging strongly. This, in turn, has often changed the setting in which palliative care services are provided from hospital to home. The two cases that follow show a potential hazard in the current system.

Case reports
Case 1
A boy with congenital rhabdoid tumour of the face received palliative care at home for progressive disease. The tumour grew to involve almost half of his face, with inferomedial displacement of his palate. He presented with pain seven weeks before his death. Initially the pain was controlled with codeine and simple analgesics, but it eventually intensified. He was then treated with morphine. The dose was gradually titrated upwards to relieve his pain. He stayed normally alert and interactive as the dose was increased.

Two days before his death, he developed sudden signs of obstruction to his airway, with stridor and respiratory distress. He had been prescribed lorazepam in anticipation of such an event. This was titrated until it helped. He was sleepy but could be roused, and he no longer seemed anxious, despite visibly laboured breathing.

A paediatric palliative care nurse saw him two hours before he died. At that time, he had an increased respiratory rate but was cyanotic. Although he still had laboured breathing, he slept peacefully. He died the day before his first birthday. His mother refused to have his body removed from the home the night of his death and declined to have a nurse come to the home to help. The next day, in a lengthy visit, a paediatric home care nurse tried but failed to have the parents release the body to a funeral home. Encouragement to return the baby’s drugs to the pharmacy was again unsuccessful. The parents repeatedly denied any plans of suicide, and they said that they would later return the drugs. The paternal grandmother and aunt were present, and they supported the parents’ decision.

The involved oncology and palliative care doctors, the managers of the home care nursing, the crisis unit, and the coroner were contacted. A decision was made not to intervene again until the next day. They particularly decided not to try to admit the mother to hospital against her wishes, given her denial of suicidal intent or plan, and not to force removal of her son’s body from the home. It seemed important to the mother that her baby’s body was there on his birthday.

The mother was found unconscious the next morning by her partner and was pronounced dead upon arrival at hospital. Toxicology tests at autopsy showed high concentrations of opioids and benzodiazepines, presumed to be her son’s drugs. But a review of the drugs found in the home after her death did not find any discrepancy in the amounts predicted remaining after the baby’s treatment. The previous visual review of the boy’s drugs was two days before he died.