CASE REPORT

A foreign older diabetic woman with an acute myocardial infarction: when cognitive biases in clinical decision-making become especially important

Mathias Schlögl,^{1,2} Daniel Hofmänner,² Robert Manka,³ Dagmar I Keller²

¹Department of Geriatrics and Aging Research, University Hospital Zurich, Zurich, Switzerland

²Emergency Department, University Hospital Zurich, Zurich, Switzerland

³University Heart Center, University Hospital Zurich, Zurich, Switzerland

Correspondence to

Mathias Schlögl,
mas7137@mail.harvard.edu

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SUMMARY

We present a case of an 80-year-old Turkish female patient with diabetes who suffered an acute myocardial infarction (AMI) and underwent percutaneous coronary balloon angioplasty (PTCA)/stenting. Due to new ischaemic episodes, a second PTCA/stenting had to be performed 6 days later, which revealed a partial restent thrombosis. This case report raises several important issues. First, language problems are an important barrier for safety and quality in healthcare. Second, gender, ethnicity and age differences in patients with AMI need to be considered in order to eliminate inequities in clinical practice. Third, strategies to raise the awareness of cognitive biases as well as professional training about critical thinking and decision-making skills are needed.

BACKGROUND

As adults live longer, chronic conditions such as diabetes and heart disease become more frequent.¹ The clinical symptoms of an acute myocardial infarction (AMI) differ significantly between age, gender and ethnicity as it may be different in character or location and sometimes appear as an upper abdominal pain as described in this case report. Clinicians should be aware of these differences, especially when treating ethnic minorities.^{2,3} The interplay between diabetes and heart disease in the elderly warrants special attention in the daily clinical practice and becomes even more important when cognitive biases occur.

CASE PRESENTATION

An 80-year-old female Turkish patient was brought by her daughter to the Emergency Department of a Swiss University Hospital due to dry cough, lack of energy and fatigue for the last 3 weeks.

The patient was diagnosed with type 2 diabetes mellitus 16 years earlier and her diabetes was complicated by background diabetic retinopathy and nephropathy. She also suffered from hypertension, dyslipidaemia, renal insufficiency, urinary incontinence, hypothyroidism, vitamin D insufficiency as well as recurrent symptoms of depression (amotivation and flattened affect). Her medications at the time of admission included long-acting nifedipine (30 mg once daily), nebivolol (2.5 mg once daily), perindopril (5 mg two times per day), gliclazid (30 mg once daily), metformin (1000 mg and 500 mg once daily), insulin glargine (18 IE per day), insulin aspart (personalised

schema), levothyroxine (0.075 mg once daily), mirtazapine (30 mg once daily), clomipramine (25 mg once daily) and alprazolam (0.5 mg once daily). Based on a chart review as well as on questioning the daughter, we found out that no aspirin or statin was given prior to admission.

Effective communication with the patient was hindered due to the language barrier, so her daughter, who was fluent in German, acted as an interpreter. Currently living with her daughter, the patient spent the last 30 years in Switzerland and was dependent for activities for daily living for the last 1.5 years.

On questioning, the daughter reported two different antibiotic treatments for a possible respiratory tract infection initiated from their family physician starting 3 weeks before when a chest X-ray (CXR) was inconclusive. On physical examination, the patient appeared almost in the same status as 1.5 years ago since the resident physician in the emergency department in charge treated her for a pulmonary infection at the Geriatric Department of the University Hospital by chance.

At time from the admission, the patient appeared chronically ill but in no acute distress. Her blood pressure was 176/80 mm Hg; pulse rate 90/min and regular; temperature 37.1°C, respiration rate 14/min, body mass index 34 kg/m². There was no murmur noted on auscultation. Examination of the extremities revealed minimal bilateral lower leg oedema. The patient complained about a recently exacerbated, long-standing dyspnoea New York Heart Association II–III, unproductive coughing, dizziness, urine incontinence and bilateral knee pain due to gonarthrosis. The patient did not complain of chest, arm or jaw pain, or palpitations.

Considering the fact that older patients with diabetes had an elevated risk of developing complicated lower respiratory tract infections (*Streptococcus pneumoniae* and influenza virus), a CXR and a standard laboratory assessment including inflammatory markers was ordered. At this time, no resting ECG was ordered. The CXR showed no signs of infection and inflammatory markers were normal.

After the assessment of the attending physician a couple of minutes later, the direction of the case significantly changed when the patient indicated a dull, aching pain from the lower abdomen radiating up to the chest for the last 4 hours without exacerbation accompanied by nausea.

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Figure 1 (A, B) ECG showing anterolateral ST elevation myocardial infarction.

Considering an atypical manifestation of an AMI, a resting ECG was ordered immediately, which showed a sinus rhythm at 73 beats/min and was consistent with an acute anterolateral myocardial infarction (figure 1A,B).

She was given 500 mg aspirin, 5000 units bolus standard heparin, 10 mg nitroderm transdermal patch, 2 mg morphine and was taken for primary percutaneous intervention (PCI). Coronary angiography was performed.

On this angiography, the patient was found to have a two-vessel coronary artery disease with subtotal stenosis (99%) of the first diagonal branch (DA1, culprit lesion) and two other relevant stenoses with up to 90% of the left anterior descending (LAD) as well as of the ramus circumflex artery (RCX). Using PCI and stenting with one drug-eluting stent (DES), the DA1 stenosis was successfully rechannelled with the resolution of symptoms and the patient was admitted to the intermediate care unit for one more day. Double platelet aggregation inhibition using aspirin and ticagrelor was started. Transthoracic echocardiography revealed a slightly reduced ejection fraction (50%) with an akinesia and dyskinesia of the apex as well as an akinesia of the adjacent anterolateral wall sections to the midventricular wall.

The patient stated a burning sensation in the lower abdomen 4 days later, which was described somehow similar to the symptoms of the prior AMI. The resting ECG was similar compared with

the one before, and hs-Troponin-I was still slightly increasing, but no other action was taken unless administration of proton-pump inhibitor (PPI), after which the burning sensation stopped.

The elective recoronary angiography 2 days later showed a partial in-stent restenosis in the DA1 in addition to the known high-grade stenoses in the proximal RCX. A second percutaneous coronary balloon angioplasty and DES implantation was performed without complications in the proximal RCX. The in-stent restenosis was treated with balloon dilatation (quantum 2.5×12 mm at 14 bar). A haemodynamic evaluation by fractional flow reserve (FFR) of the stenosis in the middle LAD segment using ACIST's Navvus Rapid Exchange Mikro-Catheter was negative (FFR=0.84). Control angiography documented a good postinterventional result with a prompt flow to the periphery Thrombolysis In Myocardial Infarction (TIMI III).

The highest levels of cardiac enzymes in the course of the AMI were creatine kinase 544 U/L, myoglobin 354/L and hsTroponin-I 1576 ng/mL. The patient was discharged to a cardiac rehabilitation 23 days later with daily regimen of aspirin and ticagrelor for 12 months.

DISCUSSION

From our perspective, the lesson learnt from this case incorporates both an important clinical as well as a psychological perspective.

From a clinical point of view, analyses of large trials and registry data suggest that male and female patients with AMI differ in age, ethnicity, timing of symptom onset, clinical presentation and pre-existing comorbidities.^{2–6} As highlighted in this case report, there is an urgent need of assessing older adults with diabetes who are at substantial risk for complications of the disease.⁷ These differences have significant clinical implications especially for elderly women from ethnic minorities. Future investigations should therefore enrol and report more women, elderly patients and minorities to improve gender-based and ethnicity-based evidence for treatment modalities as well as for professional society guidelines.⁶

From a psychological point of view, cognitive biases may affect clinical reasoning processes which may lead to errors in the diagnosis, management and treatment of medical conditions and can be associated with poorer outcomes such as medication non-compliance, overuse, patients' dissatisfaction, medical complaints, increased length of stay, increased costs and ultimately unnecessary deaths.⁸ Several factors can increase the likelihood of cognitive biases such as person (eg, cognitive loading, fatigue), patient (eg, complex patient presentation, number of comorbidities) and system factors (eg, poorly accessible IT, poor teamwork/communication).^{8–12}

In this case, there was a mix of personal and patient factors. The responsible resident knew the patient and her daughter from the prior hospitalisation, where the reason for admission was almost the same (cognitive load). Furthermore, the language barrier significantly complicated the assessment of the present medical history considering the already pre-existing multimorbidity.

Other barriers that may have hindered an effective communication are cultural differences¹³ and low health literacy.¹⁴ The Institute of Medicine reports that there is a huge disparity between how people receive and comprehend health information. More than 90 million adults—nearly half of American adults—have trouble understanding and using health information.¹⁴ In the current case, the educational status from the patient is unknown.

Therefore, the relevant cognitive biases in this case include anchoring (the tendency to fixate on specific features of a presentation too early in the diagnostic process), ascertainment bias (shaped decision-making based on prior experiences from the last hospitalisation 1.5 years ago), the framing effect (how information is presented) and the availability bias (judging likelihood of a diagnosis based on the ease with which examples can be retrieved more familiar, common, recent and/or memorable).

Based on the second-most cited article in emergency medicine education literature 'Achieving Quality in Clinical Decision Making: Cognitive Strategies & Detection of Bias' from Croskerry and colleagues,¹⁵ the following strategies could have been used to avoid cognitive bias: raising awareness of the anchoring tendency (anchoring bias), staying alert for discriminatory comments about patients that may lead to unjustified expectations (ascertainment bias), raising awareness of the framing tendency and its pitfalls (framing effect) and being aware of the tendency to pay too much attention to the most readily available information (availability bias). Using a form of 'debiasing', the authors hope not only to show some typical errors but also emphasise ways how to avoid it. Moreover, there

is an urgent need for professional training about critical thinking and decision-making skills such as the 'prospect theory' developed by Kahneman and Tversky, whose work pioneered the field of behavioural economics assessing the mostly counterintuitive processes underpinning decision-making.¹⁶

Learning points

- Language problems are an important barrier for safety and quality in healthcare.
- Gender, ethnicity and age differences in patients with acute myocardial infarction need to be considered in order to eliminate inequities in clinical practice.
- Strategies to raise the awareness of cognitive biases as well as professional training about critical thinking and decision-making skills are needed.

Contributors All authors have contributed to this work, acquired the data and contributed to writing and editing the manuscript and discussion. MS planned and designed the initial draft.

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