Debate & Analysis

SAFER diagnosis:

a teaching system to help reduce diagnostic errors in primary care

INTRODUCTION

There is increasing evidence that errors in diagnosis are relatively common in primary care and that the vast majority are preventable.[1,2] The human and financial cost of diagnostic errors is significant, leading the World Health Organization to declare that reducing diagnostic errors in primary care should be considered a global priority, adding that, *'Training focused on the causes and impact of diagnostic error might help providers become more competent in error prevention.'*[3]

Although research has been published on how GPs perform diagnostic reasoning and on the causes of diagnostic errors in primary care, very little information is available on how to prevent or detect diagnostic errors.[4–6] This article describes a mnemonic, SAFER AAA'S (Box 1), which can be used to both prevent and detect those diagnostic errors that are the most likely to cause serious harm to patients in the primary care setting.

THE MECHANICS OF DIAGNOSIS

The 'mechanics of diagnosis' is a simple concept to facilitate discussion about how a diagnosis is made and where errors can occur in the diagnostic process (Figure 1). In this model, establishing the correct diagnosis becomes a function of possessing the correct medical knowledge, gathering the correct information during the clinical assessment, and performing diagnostic reasoning correctly. Conversely, diagnostic errors occur when the correct medical knowledge is either not acquired, or not applied during the consultation; when the correct information is not gathered during the clinical assessment; or when diagnostic reasoning is not performed correctly. In primary care, patients present with a symptom, not a diagnosis, so it is important that a symptom-based, patient safety-focused approach is taken during the diagnostic process.

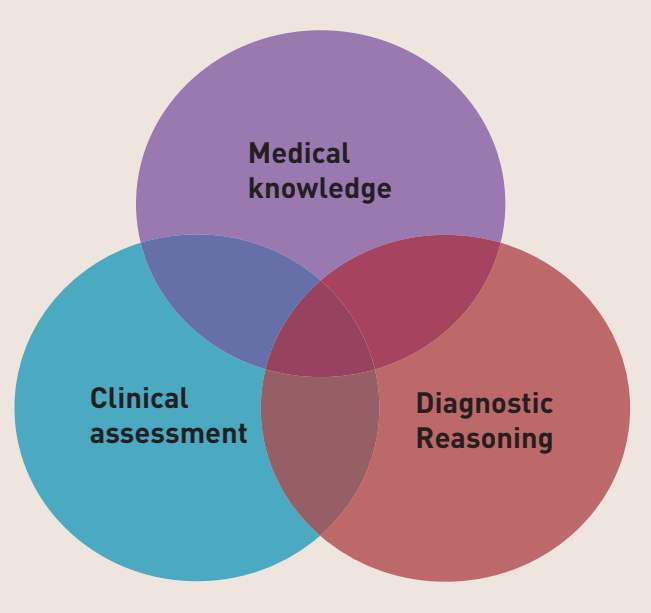

Figure 1. The mechanics of diagnosis.

The mnemonic is designed to help trainees focus on learning how to identify the serious and most frequently misdiagnosed causes of the symptoms that they will encounter in their patients and to consider these causes during the consultation.

SAFER AAA'S IN ERROR PREVENTION

One of the most important roles that a GP has is to identify patients who are seriously ill, or at increased risk of developing a serious complication of an illness. However, in order to be able to 'exclude the worst, first', a GP must know what to exclude and how to exclude it. The first two letters of the mnemonic emphasise the importance of learning about the serious, 'must-not-miss' causes for the symptoms that patients present with in primary care, as well as the alternative, 'must-always-consider' causes that are the most commonly missed causes.

The most commonly missed causes in primary care relate to three disease processes, namely cancer, vascular events, and serious infections, and it is often the early and atypical presentations of these disease processes that are not diagnosed correctly, which the mnemonic helps to highlight. In order to be able to exclude these important causes, it is necessary to be able to recognise the typical, atypical, and early presentations of these serious causes, including the red-flag findings in the clinical assessment that indicate their presence. It is also important to be able to identify those patients at increased risk of either having a serious cause for their symptoms, or developing a serious complication of what would normally be a minor illness.

Over time, GPs learn to recognise the key findings that discriminate serious illnesses from normal patterns of minor illness and incorporate this knowledge into their clinical assessments. It is important that experienced GPs share their knowledge of the subtle findings that do fit with serious illness and those that do not fit with a normal pattern of minor illness, or a normal exacerbation of a chronic illness, so that trainees can add this information to their medical knowledge base and embed this into their clinical assessments and diagnostic reasoning process. Critical thinking regarding the findings that do and do not fit with diagnoses helps to prevent diagnostic errors.

The function of a clinical assessment is to gather information about the patient and their symptom so that this information can be applied in the diagnostic reasoning process. A generic clinical assessment that is not focused on gathering symptom-specific, patient safety-focused information presents the risk that a key piece of information will not be gathered, resulting

Box 1. SAFER AAA'S

S = Have you excluded the serious, 'must-not-miss' diagnoses?
A = Have you considered the alternative, 'must-always-consider' diagnoses?
F = Have you checked for any findings that do not fit with your preliminary diagnosis, or fit better with a different diagnosis?
E = Have you considered that this could be an early/atypical presentation of something serious?
R = Have you checked for the red flags and risk factors for a serious illness or complication?
A = Have you assessed the patient and the quantity and quality of the information gathered?
A = Have you analysed the preliminary diagnosis, or only relied on pattern recognition?
A = Have you avoided a diagnostic reasoning malfunction or dysfunction?
S = Have you safety-netted the patient?

"SAFER AAA'S provides a systematic approach to the prevention and detection of diagnostic errors in primary care, which can be used in both training and in clinical practice."

in a diagnostic error. The mnemonic can be used to help trainees develop a portfolio of symptom-based, patient safety-focused, clinical assessments that are designed to gather the specific information required to confirm or exclude the serious and commonly missed causes of each symptom.

Medical knowledge of these causes and how they are excluded should be incorporated into the clinical assessment not just to ensure that the correct information is gathered but also to act as a memory trigger. Proactive checks for red flags and risk factors can be embedded into the clinical assessment, along with scoring systems and risk assessment tools. These can help to detect serious illnesses in their early stages and identify patients at increased risk of serious complications.

It is also necessary to evaluate both the quantity and quality of the information that has been gathered, not just in terms of whether or not more information is required to establish the correct diagnosis but also to assess the reliability of information gathered, including the sensitivity and specificity of all parts of the clinical assessment, including tests and investigations. The phrase 'rubbish in, rubbish out' is a pertinent reminder of the need to evaluate the quality and quantity of any information that has been gathered before it is delivered to the diagnostic reasoning process.

The second part of the mnemonic is designed to encourage trainees to think about how diagnostic reasoning is performed and the importance of reflecting on the way that diagnostic reasoning is performed in general practice.[7] Diagnostic reasoning errors can arise because of a reasoning system dysfunction, such as may occur when a faulty heuristic of cognitive bias develops, or it can be the result of a transient reasoning malfunction arising during the consultation.[8]

Discussing the clinical scenarios where transient reasoning malfunctions may occur can increase self-awareness. Practical ways of preventing these malfunctions can also be discussed, such as avoiding interruptions and distractions during the consultation and creating protected time after the consultation for reflection and critical thinking. It also emphasises the importance of safety-netting advice in managing the risk of diagnostic error and uncertainty.

SAFER AAA'S IN ERROR DETECTION

An important principle in applying the mnemonic for error detection is to consider diagnosis as a two-stage process, where the first diagnosis reached becomes the preliminary diagnosis, representing a 'diagnostic hypothesis' that exists to be tested and challenged before it is accepted. The mnemonic is then applied to the preliminary diagnosis as a diagnostic error checklist before the final diagnosis is made.[9] The mnemonic can be used on electronic devices as a generic screen prompt; or incorporated into a symptom-specific template or algorithm. It can also be used after the consultation when reflecting on diagnoses, or discussing patients with colleagues, including cases where diagnostic errors have occurred to identify the cause of the error and offer a solution to prevent it from recurring.

DISCUSSION

A patient undergoing a medical procedure will experience a series of checks throughout their treatment that are focused on patient safety and designed to reduce the risk of treatment errors. These checks are not considered to be optional and they form an integral part of the patient's treatment plan. In contrast, no such measures are in place to reduce the risk of diagnostic errors occurring in the consulting room. Perhaps this is why diagnostic errors are twice as common as treatment errors and why up to 80% of errors in diagnosis are considered to be preventable?

There is an urgent need to improve training in diagnosis and diagnostic error, and to introduce systems to help reduce the risk of these errors and the serious harm that they cause to patients. SAFER AAA'S provides a systematic approach to the prevention and detection of diagnostic errors in primary care, which can be used in both training and in clinical practice.

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