



The Case of Cognitive Overload

Case by Dr. S. Lockett-Gatopoulos

Case

Dr. S. Lockett-Gatopoulos

Objectives / Questions:

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Expert Commentaries

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Haley had come to think of the nurses in the emergency department as lifesavers. As a first year resident, she often found the nurses' clinical acumen far exceeded her own; they sometimes reminded her to order investigations she hadn't yet thought to initiate, and occasionally began the diagnostic workup with bloodwork while she was waiting to review with her staff preceptor. She started to think of the nursing staff as one of her safety nets in the department and felt comfortable knowing they often picked up on her mistakes.

It was a really busy day in the department this evening and several nurses were working double shifts due to recent nursing shortages. Naturally, when a nurse from the triage desk came into the department and asked Haley to see the tachypneic young man being wheeled into the stretcher bay, she put down the chart she was working on and happily obliged.

The 20-year-old man with a known history of asthma was breathing rapidly and appeared quite diaphoretic. The paramedics relayed some of his history, specifically that he had been febrile and coughing for the past week, to the point that his ribs ached with each breath. He had tried using his rescue inhalers, but their effect was diminishing as the illness progressed. His cough had progressed and now was productive with green sputum, and his breathing had worsened in the last 24hrs. When Haley auscultated his lungs, she could hear extensive crackles on the right side and diffuse wheezing. Likely pneumonia, she thought. She glanced up at the cardiorespiratory monitor and saw that his heart rate was elevated at 135 and respiratory rate was 30. She figured given the severity of his symptoms and presentation she should promptly initiate the departmental Sepsis protocol while she waited to review with her attending, Dr. George.

'Hi, I don't think we've met. I'm Haley. I will be filling out the sepsis order set for this young asthmatic here in stretcher bay 5. He looks pretty sick. I'm actually quite concerned about him. Could you start some of the work-up right away and I'll review this with Dr. George as soon as he's available.' Haley signed the sepsis protocol and ticked off the box for a litre of normal saline to be administered. She figured she would review the antibiotics with Dr. George before proceeding.

'Not to worry,' the nurse replied. 'I've already started these,' she gestured to the blood work order set in her hand. 'I've put in 2 IVs, sent off blood work and cultures

and he has some fluids running. I've also called the respiratory therapist to come assess him.'

Relieved that she had a veteran nurse on the case, Haley quickly reviewed the case with Dr. George, signed a new order sheet with additional fluids, antibiotics, chest x-ray and urinalysis ordered along with some puffer orders. She quickly dropped the order sheet off on the patient's chart and then picked up the next chart waiting to be seen. The next case was a simple finger fracture so she figured she'd have time to see this one while managing the sick asthmatic.

After finishing with the fracture, Haley was called into a trauma case and was able to assist with a chest tube. She then went back to review the board and realized she hadn't checked on that asthmatic patient in almost 2 hours. She logged into the image viewing system to see his chest x-ray. She was surprised that it hadn't been done.

She approached the patient's nurse and asked, 'Do you know why our patient in stretcher bay 5 hasn't had his x-ray?'

'Oh...I didn't put that in. I figured you would.' She replied. She was balancing 5 emergency patients at once and appeared slightly flustered.

Haley glanced over at the patient. He appeared incredibly uncomfortable and seemed to be fatiguing. The respiratory therapist had started some nebulized ventolin/atrovent but he was still working hard to breath and had a heart rate of 130.

'How much fluid has he received? Did you give him anything for pain? Did you start the antibiotics?' Haley asked nervously.

The nurse looked up at Haley, 'I sent off blood work and started a bolus of saline. But we can't start additional interventions without a doctor's orders. You need to order that.'

Haley flipped through the order set. Sure enough, her signed order sheet was on the chart. She was so confident the orders would be done. This nurse was one of the best she had worked with. She didn't think she would have to get after her to do the work. Haley could feel her cheeks getting red... She kept thinking: 'How could I have let this patient sit here for 2 hours without additional fluids or antibiotics! If he deteriorates, this is on me!'

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Questions for Discussion

1. How could Haley have avoided this dilemma?
2. What strategies can physicians employ to lighten the cognitive load and avoid medical error?
3. Should Haley disclose this medical error with the patient and how should she go about it?

Competencies

ACGME	CanMEDS
Professional Values (PROF1) Team Management (ICS2)	Professional Communicator Collaborator Patient Safety

Intended Objectives of Case

1. Discuss and identify personal, team-based, and systemic/environmental factors that might contribute to errors.
2. Describe an approach for disclosing error.
3. List specific things that can be done to manage or decrease cognitive load in the Emergency Department (ED).

Cognitive Overload and Communication Breakdown

by Amy Walsh MD, MDP

Unfortunately many of us have probably faced this type of situation where patient care is not delivered as optimally or efficiently as we had initially planned. However with experience and an increased emphasis on team communication these types of situations can be prevented. For patients whom you know the exact treatment plan you want to execute, speaking directly to nursing staff to make sure they understand the orders is crucial. Haley could have better communicated with the patient's bedside nurse, which would have likely resulted in better patient care. Explicitly telling other team members what disease process you are concerned about in addition to your thoughts about potential pitfalls that may occur while the patient is in the emergency department can provide clarity regarding your perception of the patient's condition and expected Emergency Department course. This can be achieved by directly stating, "This patient is sick, I am concerned about x,y,or z. Please let me know if he/she is getting worse in a, b, or c ways." When faced with a situation similar to Haley's, I try to find a 'veteran nurse' and ask to pause for a moment to discuss the orders to make sure we are both on the same page. This type of "closed loop communication" has been extensively cited in the resuscitation literature and should be a regular part our team communication when dealing with any critical patient (1). Depending on the practice environment and availability of nursing staff within the department I may also ask another nurse or staff member to help out with a sick patient to expedite investigations and management.

In this case, Haley got distracted and attended to two other cases before returning to reassess her deteriorating asthmatic patient with a likely pulmonary infection. Faced with a similar situation, I would ensure the nurse and the rest of the patient's care team understand the plan and that the missed orders are dealt with immediately and then I would update the patient, apologize for the delay, and assure him that our team will be monitoring him very closely. Communicating that an error occurred and apologizing for it is important for several reasons. First, it re-establishes trust with the patient and strengthens the physician-patient relationship (2). Second, disclosing an error offers an

opportunity to reevaluate the systems and cognitive errors that played a part and can help devise an active plan to prevent similar occurrences in the future. Patients like to hear that their physician is promoting safe and quality medical care and that something is being done about their situation in order to improve the process for others. And lastly, physicians have a moral, ethical and professional duty to disclose any medical errors that may have adversely affected their patients (3).

In busy EDs there is always a balance between efficiency and error prevention. Communication between staff and also with patients is paramount to maximizing efficiency while still preventing critical errors. Busy EDs often develop systems in which nurses can initiate medical directives . Without nurses taking initiative, patient flow would probably grind to a halt. The fact that Haley had come to rely on nurses initiating basic investigations suggests that this is likely a common practice in her hospital system. In most cases, this increases efficiency and can even provide some useful education to new residents. Though it does not happen often, this gain in efficiency can also lead to an increase in error with missed orders, delays in care, or even unnecessary treatments. Bottom line, communication is key regardless of the system in which you work. Even if additional processes are in place to help safeguard our patients, they don't compare to the simple strategy of maintaining good communication with our healthcare team and closing the loop to ensure the job is done well!

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About the Expert

Amy Walsh (@docamyewalsh) is the Global Emergency Medicine Fellowship Director at Regions Hospital in St. Paul, MN. She also works at two critical access hospitals in Western Wisconsin. Her areas of interest are the impact of context of appropriate care and clinical decision making, the impact of mass incarceration and housing discrimination on health, and health promotion in the ED.

Expert Response

Addendum

By Amy Walsh MD, MDP & Her Father

My dad, Bob Walsh, who spent his career in nuclear power, had some interesting thoughts on the case as well, so I thought I'd share them here (in blue):

You mentioned in your response when the ER is busy there is "a balance between efficiency and error prevention". We were taught in Nuclear Power that when it came to Nuclear Safety human error was unacceptable. I am not sure that all human error is preventable but that is what was drilled into us.

This philosophy morphed into if you are following procedures you can not make human errors. Again I think that can be taken to an extreme which lead to problems just as bad as human errors. It got to the point where technicians did not think about what they were doing they just followed the procedure. If the investigation found they followed the procedure, they had done nothing wrong. This reinforced that way of thinking.

Anyway, I do not think the issue is balance between efficiency and error prevention. I think the issue is whether the condition that brought the person to the ER can wait on a thorough troubleshooting process or does something need to be done now or the condition will worsen.

In my mind the emergency physicians sometimes need to make decisions based on the information they have, They cannot always wait for all the information they need to make an informed decision.

Once the decision is made, the process should ensure the risk of Human Errors is minimized.

Some of the techniques we used that could be applicable to you are:

1. Briefing and handover
2. STAR
3. Post job review for critical tasks

Briefing-once the decision is made, brief the involved staff.

1. Patient condition
2. Explanation of required treatment
3. Expected results of required treatment
4. Expectations for being notified
5. Determine parameters to be monitored and determine thresholds for further action.
6. Discussion of what is the worst thing that can happen and any mitigating actions
7. Discuss any actions that require Independent or Concurrent Verification.

Editors note: This addendum was initially posted as a comment on this blog post, but we thought it was so great that we have added it to the actual blog post. Minor copy edits have been made to enhance readability.

Three-Way Communication (Closed Loop Communication)

All communication between doctors and staff should be three way. In the case of doctors giving orders the doctor should explain what is expected, the nurse should repeat what the doctor said and then the doctor should confirm the nurse is correct or clarify the order based on what the nurse said.

STAR

All staff performing an activity that will impact the health of a patient should use STAR

Stop a moment to think about what you are about to do

Think about what you are about to do and about how you are going to do the task.

Act according to the plan you developed

Review what you did to ensure the desired results were obtained

Post job review for critical task

1. Review the critical task with everyone involved
2. Discuss what went right and what you need to do to ensure it is always a good result.
3. Discuss what went wrong and discuss what you need to do to prevent a bad result.
4. Determine if any of the lessons learned need to be institutionalized.

There are also the doctors with an "expert complex" that need to be dealt with. In some cases doctors don't want to hear feedback on their orders. In other cases staff is afraid to give feedback on the orders because the doctor is viewed as the expert. The doctor and staff need to be receptive to providing and receiving feedback. If there is disagreement the doctor wins but the discussion will at least ensure the doctor has considered alternatives.

OK, Amy here, a few thoughts on what my dad said. In my experience, I think we do a pretty good job of closed loop communication. I think there are widely varying practices in the other three suggestions, though I think most of us do it in some form. It probably would be helpful to both teach and practice this in a more systematic way.

Regarding efficiency versus error prevention, I was hoping to convey that I would make less mistakes for the individual patient in front of me if I could see one patient at a time, look thoroughly at their medical record, and complete their treatment plan without interruption. However, both patients and

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hospital administrators would find the wait times that would result from me doing those things to be unacceptable.

It's not necessarily efficiency per se, but efficiency in a more utilitarian sense that the ability to appropriately prioritize tasks and patients is one of the foremost skills of the Emergency Physician. Getting bogged down figuring out a complex, but non-critical patient can decrease the safety for the critical patient in the waiting room.

There are some important differences between Emergency Medicine and many of the safety examples shared in nuclear power and airline, procedure, but I think the processes my dad suggests are applicable. Of course, unlike nuclear power/airlines when conditions are highest risk there is not an option to ground the flight or shut down the plant. The number and frequency of high risk, high consequence decisions increase, and the human body is infinitely variable so there would likely be more exceptions to "standard operating procedures". However, sometimes, I think we look at the differences between the two as a reason to avoid implementing effective strategies, when really there are a lot of lessons that could be adapted and applied.

Anyway, I really enjoyed what my dad had to say, and hope you find it helpful too.

Check, communicate, and check again

By Jimmie Leppink MSc, MSc, LLM, PhD

The question of how residents can deal with a heavy information-processing load in settings like these is one of crucial importance. As one becomes more familiar with a complex environment, like the one in which Haley is trying to find her way, one's cognitive schemas of that environment – and of the types of tasks one performs in that environment – become more developed [1]. As that happens, the mental load from having to process many interacting information elements in a very limited timespan – patient's history, patient's current symptoms, auscultation, checking the cardiorespiratory monitor, initiating the departmental Sepsis protocol, communicating with nurses, reviewing the antibiotics with a colleague, ordering other investigations – decreases, because one can increasingly activate relevant cognitive schemas for task performance [2]. Automating these schemas allows one to recognize patterns gleaned from experience, routinely perform procedures, and reserve cognitive resources to be available for information that has to be processed with more effort [3].

As an early trainee, it is great that Haley is proactively identifying safety nets within her work environment, including the nursing staff that could pick up on her mistakes. Collaboration between team members of different disciplines can promote a safe working and learning environment for residents. Nevertheless, frequent and timely communication with nurses and other colleagues in the department remains of paramount importance; feeling safe with the nursing staff should not result in less communication. Especially in the light of the recent nursing shortage in Haley's department, a lack of communication can create dangerous situations [4]. Haley's surprise with the fact that the chest x-ray of the 20-year-old patient had not been completed may reflect a lack of communication with the patient's nurse and eventually others responsible for this case. Timely communication could have prevented this delay. If Haley was aware that the nurse was balancing five emergency patients simultaneously, then Haley might have followed up on the progression of the patient's care prior to becoming involved in the care of a new patient. Whether one is a trainee or an experienced resident, it is important to have an approach to facilitate communication,

manage heavy information-processing load, and reduce the likelihood of erroneous decisions. An example method to help achieve these goals is to determine what steps have already been completed and what steps remain incomplete in regards to the patient's care plan. Sibbald and colleagues [3] provide a thoughtful and concise overview of what and how to check decisions made in a case. As the authors suggest, there are particular moments during a patient's emergency department course that are particularly conducive to taking a pause and checking that all the patient's providers are aware of the plan of care, including “after drawing blood, after admitting a patient, before conducting a procedure, or after writing a prescription” (p. 112 in [3]). Moreover, the authors emphasize that checking decisions and communicating accordingly should be made a habit and should not be skipped even in crises. An evidence-based approach to facilitating this practice of continuous communication is found in the use of so-called pre-procedural checklists [5]. These can help providers to check common variables that are easily overlooked, may help both residents and physicians to verify and recollect key data, and can help coordinate a team [3]. “Likely pneumonia” may be Haley's first thought after auscultation, but a checklist can help to structure the examination, reduce bias, and reduce the likelihood of incorrect decisions. Finally, checklists can help reduce the temporal split attention that arises from having to preemptively leave one case (here: the tachypneic young man) and becoming involved in one or two other cases (here: finger fracture and trauma case). Since split attention is known to hinder learning and may in a high-stakes environment like an emergency department easily contribute to cognitive overload on the part of a resident, reducing split attention is especially important for residents [1].

Identification of a medical error is very important because, in an error-prone environment like an emergency department, error is frequently the product of a combination of factors (e.g., shortage of staff, lack of checklists, lack of communication) rather than of an individual actor not paying enough attention [4]. Timely and thorough communication of a medical error helps a team to understand which systemic

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factors may have contributed to the error and how the likelihood of such an error occurring can be minimized. Therefore, Haley should communicate this medical error to Dr. George and other members of the care team who can influence the system and work environment to minimize the risk of such an error occurring in future. Next, the team should discuss what are possible consequences of the error for the patient and how the error should be communicated to the patient. The latter would probably be appropriate at the bedside, in the presence of family or friends around, when the patient's state is no longer that critical. For a safe learning and work environment, it would probably be good to have Dr. George (as her attending) rather than Haley start and take the lead in the communication to the patient.

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About the Expert

Postdoctoral researcher in education and statistician at the School of Health Professions Education, Maastricht University, the Netherlands. His research interests include adaptive approaches to instruction and assessment, cognitive load theory and measurement, research methods in education, and multilevel analysis of educational data.

Curated Community Commentary

By S. Lockett-Gatopoulos MD, FRCPC (candidate)

This month's case looked at the chaotic on-shift experience of Haley, a first-year emergency medicine resident. After Haley assesses an asthmatic patient with an exacerbation and probable sepsis in the emergency department, she submits initial treatment orders and then drops off additional orders after reviewing the case with her attending physician. Haley is then drawn into a less urgent case, followed by a trauma. When she finally returns to re-assess the asthmatic patient two hours later, Haley finds that he has clinically deteriorated. Adding to the challenge of the case, the emergency department is overcapacity and understaffed, and the senior nurse looking after Haley's asthmatic patient has not completed some of Haley's orders.

The discussion questions associated with this case centred on avoiding error, disclosing error when it happens, and lightening cognitive load in the emergency department. Through the online discussion, a few main themes arose.

First, participants in the online discussion emphasized that no one individual creates error in the emergency department. Drs. Shawn Mondoux and Kaif Pardhan, both attending emergency physicians, reminded us of the 'Swiss cheese model' of error. The Swiss cheese model of error describes a series of opportunities that exist to identify an error, where the error only occurs when it slips through multiple layers of lined up Swiss cheese 'holes'. In this month's case, Haley might have returned to assess her patient sooner, the experienced bedside nurse might have realised the orders had been placed but not completed, the respiratory therapist might have brought the team's attention to a deteriorating patient, the attending physician might have checked in on a critical patient after reviewing the case with his junior resident, or the ED might have had a system in place to flag critical patients and interventions. It is only because several opportunities to correct a potential error were missed that the error was ultimately committed. Dr. Mondoux commented that '...

Contributors

Thanks to the participants (in alphabetical order) for all of their input:

Teresa Chan
John Eiken
Tamara McColl
Shawn Mondoux
Kaif Pardhan
Loice Swisher

a solution at any level, whether conscious or not, could have eliminated the error...' and suggested that 'maybe we should design the system to "catch" and prevent human error, rather than depending on the human to modify behaviour and appreciate risk at every layer.'

Some participants suggested potential solutions to avoid undetected error. Dr. John Eiken, an emergency physician, described EDs 'where patients' names are "flagged" on the EMR board...to aid providers in avoiding errors and meet[ing] treatment timing goals'. He reported that, in his experience, this approach seemed to have a positive impact on patient care. Dr. Tamara McColl described a special whiteboard wherein physicians and their nursing colleagues can write special communications to one another regarding patient care. Dr. Pardhan suggested that 'from a very practical standpoint, it may be helpful to stay at the bedside until all of the critical interventions have been carried out...' noting that Haley, as a junior resident, has time to do this as she isn't responsible for departmental flow and may benefit by seeing how bedside interventions are carried out. She could also offer an extra hand to the overextended nurses. Dr. Loice Swisher asserted that this approach makes sense, especially for a junior resident, whose goal should not be to see as many patients as possible, but rather to '... see the trajectory of disease with different interventions'. Both Dr. Pardhan and Dr. Swisher agree that checking in with nurses, who are also carrying a

Curated Community Commentary

heavy cognitive load, is a wise strategy, particularly in a busy and understaffed department.

Finally, Dr. Mondoux cautioned us against using a ‘one-size-fits-all’ approach to lightening cognitive load and reducing errors in the ED. Likening an error to a patient’s chief complaint, Dr. Mondoux explained that just as we wouldn’t treat every patient with chest pain with blood thinners as if he had a pulmonary embolus, so we should avoid approaching every error with the same pre-fabricated solution. In the present case, it is not clear whether a chart flagging system, a notation in the electronic medical record, or staying at bedside with a critical patient would be the optimal solution. In situations where errors occur, we must appropriately diagnose the cause of the error through careful examination of circumstances, systems, and participants in order to arrive at a practical and useful solution or set of solutions.

There was some further discussion regarding whether Haley should disclose the error to the patient and his family. While all agreed that the error should be disclosed, most also agreed that Haley, as the junior resident, should not bear the brunt of this disclosure. Dr. Pardhan suggested that ‘Dr. George should play a significant role - either coaching her through the disclosure or modelling disclosure techniques’. Dr.

Swisher agreed, adding that ‘...Dr. George bears significantly more responsibility [than Haley] for the delay,’ and suggesting that attendings ought to ‘not only focus on content but also process’ and ‘...teach the pearls and tips of great communication’ within the busy environment of the emergency department, where communication errors are unfortunately a common occurrence. All agreed that any disclosure should wait until the patient is stabilized, with any intervention taking precedence over immediate disclosure.

About

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