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Tunnel Effect in Medicine

Erragh, K Amanzoui*, M Elharit, K Elfakhr, S Kalouch and A Chlilek

Casablanca School, Morocco

***Corresponding Author:** K Amanzoui, Casablanca School, Morocco.

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Abstract

The tunnel effect corresponds to a cognitive bias that leads to fixation on an expected result, which favors the occurrence of errors by preventing consideration of all the elements available. Cognitive biases, of which the tunnel effect is a part, are the consequence of the limited capacities of humans under certain conditions to take into account and process all the information potentially available.

Study concerning two clinical situations that occurred in September 2022, hospitalized in the pediatric intensive care unit of the EL Harouchi hospital in Casablanca, and having the objective of illustrating the tunnel effect in the diagnostic approach within our service.

The first case was of a 3-year-old girl with a history of two asthmatic brothers, admitted to the emergency room for febrile respiratory distress, and treated in the intensive care unit as severe acute asthma. The evolution was marked by the persistence of the respiratory signs, of which a thoracic scanner was carried out objectifying the presence of a foreign body intra bronchial lobar left superior, the patient had a bronchoscopy with extraction of the foreign body, and the clinical evolution was favorable, allowing her to return home.

2nd case was a 5-year-old boy, with a personal history of two episodes of wheezing dyspnea, presented to the emergency room for respiratory distress with suspicion of inhalation of a foreign body. The mother reported a notion of taking peanuts 2 days before. The patient benefited from a bronchoscopy which was normal, 10 min after the gesture, he worsened on the respiratory level, of which he was sent to intensive care for additional care. Treated as a severe acute asthma attack, the evolution was favorable.

In clinical practice, it is important to be aware of the existence of these cognitive biases and of ways to reduce them.

Keywords: *Tunnel; Effect; Children; Medicine; Errors*

Introduction

The diagnostic approach in clinical medicine is well codified and allows, as information is collected, to narrow the spectrum of differential diagnoses to retain only one, or a few.

This cognitive exercise is done intuitively and is perfected with experience. The tunnel effect corresponds to a psychic dysfunction, a cognitive bias that leads to fixation on an expected result, which favors the occurrence of errors by preventing consideration of all the elements available. Cognitive biases, of which the tunnel effect is a part, are "the consequence of the limited capacities of humans under certain conditions to take into account and process all potentially available information".

Materials and Methods

We conducted a study concerning two clinical situations that occurred in September 2022, hospitalized in the pediatric intensive care unit of the EL HAROUCHI hospital in Casablanca, and with the objective of illustrating the tunnel effect in the diagnostic approach. within our service.

Results

First case

3-year-old child with a family history of 2 sisters and 2 cousins with asthma, admitted for febrile respiratory distress dating back 2 days with a dry cough, aggravated after 24 hours by signs of respiratory struggles, with bilateral sibilant rales on auscultation and neurological distress.

The patient was initially treated as a severe asthma attack.

A biological assessment made showing a blood sugar at 3g/l with traces of acetone on the urine dipstick, bicarbonates at 5 mmol/L, then treated as inaugural diabetic ketoacidosis.

Faced with the persistence of respiratory signs, a chest CT scan was performed, objectifying the presence of a left upper lobar intrabronchial foreign body.

The patient underwent a bronchoscopy with removal of the foreign body.

The clinical evolution was subsequently favorable, allowing the patient to return home.

Second case

A 5 ½ year old child with a personal history of two episodes of wheezing dyspnea at the age of 3 and 4 years, presents to the emergency room for respiratory distress with suspicion of inhalation of a foreign body. The symptomatology dates back to the day of his admission by the sudden onset of a bout of suffocating dry cough in a context of apyrexia. The patient received cycles of nebulization with corticosteroid therapy, and with the patient's non-improvement, he was sent to the intensive care unit for additional care.

Neurologically confused patient 14/15.

On the respiratory level, he presented unilateral sibilant rales on the right level, signs of intense respiratory struggles with SaO_2 at 94% under a 15L high concentration mask.

The mother reported a notion of taking peanuts during the two days preceding the symptomatology.

The patient received a normal bronchoscopy the next day, 10 minutes after the procedure, he presented a laryngospasm with bilateral sibilant rales and 80% desaturation, the patient was intubated urgently, sedated and sent to intensive care.

Treated as a severe acute asthma attack, the evolution was marked by extubation after 24 hours of the procedure, with good clinical improvement after 2 days of treatment, allowing transfer to the pediatric pulmonology department for additional supported.

Discussion

Cognitive biases are increasingly recognized as a source of medical error. Still incompletely understood [1].

This awareness has thus led to an increase in clinical and psychological research.

It should be noted that there are a multitude of other mental processes blocking the search for solutions to an acute problem, including haste, with the disappearance of any critical spirit, the omission of data or even interpretation biases, with a systematic interpretation in the sense of the chosen option [2,3].

Better knowledge and consideration of the tunnel effect and other cognitive biases can lead to improvements in the work environment.

The two clinical cases presented above illustrate, from a medical point of view, the difficulty caused by the health event on the ability of healthcare teams in an emergency situation to exercise distance [5].

For these two cases, adequate empirical treatments and comprehensive management made it possible to maintain a quality of care without loss of opportunity for the patients [4].

It is possible to attenuate the tunnel effect, or even to cancel it.

In the medical field, different methods of avoiding the tunnel effect, and cognitive biases in general, have been studied. The slowing down method, which as the name suggests is taking time for reflection, is a simple intervention with positive results backed by ample evidence [6,8]. Metacognition, or the awareness and understanding of one's own thought processes, seems to have real potential, although its use in practice is still unclear. Another method of avoidance is the teaching of statistical principles which, against all evidence, is of little clinical utility according to several experimental studies [7].

Conclusion

The tunnel effect is a daily challenge inherent in the processes of medical reasoning, which can be exacerbated by anchoring on epidemiological criteria. In clinical practice, it is important to be aware of the existence of these cognitive biases and the means to reduce them: standardization by checklists, collegial discussion, continuous training... In addition, the systematized analysis of adverse events can identify the contribution of cognitive biases and justify the strengthening of preventive measures.

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