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The impact of intrinsic capacity and physical resilience on health outcomes: a case report

O impacto da capacidade intrínseca e da resiliência física em desfechos de saúde: um relato de caso

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Abstract

Justification and objective: The physiological changes that accompany human aging increase the risk of disease and care dependence. To meet the health needs of older adults, care must go beyond diagnosing specific diseases and assess the impact of these conditions on functional capacity. The concepts of intrinsic capacity and physical resilience aim to explain the trajectory of various health outcomes in older adults. The case presented below illustrates the positive impact of intrinsic capacity, together with external resources, on the prognosis of an older patient during a catastrophic health event. **Case description:** A 91-year-old widower was diagnosed with severe dehydration, delirium, pneumonia, and a grade IV pressure injury after lying in his home for 6 days. He remained hospitalized for 87 days and was discharged with almost complete recovery of his functional capacity. **Discussion:** The main point of this case is the positive health outcome experienced by a nonagenarian patient given the severity of the events. From the perspective of intrinsic capacity, he was functionally independent, had good sensory function, excellent cognition and vitality, and his psychological status was positive. He is currently progressing towards complete functional recovery.

Keywords: aging; hospitalization; prognosis; case report.

Resumo

Justificativa e objetivo: As alterações fisiológicas que acompanham o envelhecimento humano aumentam o risco do desenvolvimento de doenças e dependência de cuidados. Para avaliar as necessidades de saúde de um indivíduo idoso, mais do que diagnosticar doenças específicas, o mais importante é analisar o impacto dessas condições em sua capacidade funcional. Os conceitos de capacidade intrínseca (CI) e resiliência física têm a finalidade de explicar a trajetória de diversos desfechos de saúde em idosos. O caso apresentado a seguir visa ilustrar o impacto positivo da CI, em conjunto com os recursos externos, no prognóstico de um paciente idoso durante evento catastrófico de saúde. **Descrição do caso:** Masculino, 91 anos, viúvo, diagnosticado com desidratação grave, *delirium*, pneumonia e lesão por pressão grau IV ao fim de seis dias caído em sua casa. Permaneceu hospitalizado por 87 dias e obteve alta com recuperação quase completa de sua capacidade funcional. **Discussão:** O ponto central do caso é o desfecho positivo de saúde vivido por um paciente nonagenário diante da gravidade dos eventos. Do ponto de vista da CI, ele era independente funcional, tinha boa função sensorial, excelente cognição e vitalidade, e seu estado psicológico era positivo. Atualmente, evolui com completa recuperação funcional.

Palavras-chave: envelhecimento; hospitalização; prognóstico; relato de caso.

JUSTIFICATION AND OBJECTIVES

Conceptually, health is defined as a complex interaction between physical, mental, and social well-being.^{1,2} Physiological changes that result in impaired functional reserve and accompany chronological aging increase the risk of morbid conditions and dependence.¹ Therefore, the traditional disease-oriented model of health care has proven inadequate for the growing older adult population,³ ie, care must go beyond diagnosing specific diseases and assess the impact of these conditions on functional capacity.⁴

As they age, individuals follow different functional trajectories which, in turn, result from an interaction between their intrinsic capacity and their environment.^{4,5} Thus, the concepts of intrinsic capacity and physical resilience provide us with a theoretical basis for explaining the varied health outcomes that result from catastrophic health events in older patients.^{3,6}

The World Health Organization originally conceived of intrinsic capacity as a combination of all of an individual's physical and mental capabilities at any given time, assessed in 5 domains: locomotion, vitality, sensory, cognition, and psychological well-being.⁵ The concept of physical resilience concerns the ability to resist decline or to functionally recover from a traumatic health event.⁶ Another important concept in understanding this case is functional ability, defined as health-related attributes that allow individuals to be and do what they value.¹

The case presented below illustrates the positive impact of intrinsic capacity, physical resilience, and functional skills, together with external resources, on the prognosis of an older patient.

CASE DESCRIPTION

This case report follows the CARE guidelines,⁷ and the patient provided written informed consent.

After six days without contacting his family, a 91-year-old widower who lived alone was found disoriented, lying on the floor, trapped between the bed and another piece of furniture, and covered in his own waste. He was immediately taken to a general hospital.

In the hospital emergency department, severe dehydration, mental confusion, pneumonia, and a grade IV pressure lesion in the sacral region were diagnosed. Complementary tests ruled out cardiac arrhythmia or fractures; bilateral pneumonia was found in chest computed tomography (Figure 1).

Blood tests showed kidney failure, hypernatremia, and hypothyroidism (Table 1). A family member reported that the patient, except for previous hypothyroidism, was independent,



FIGURE 1. Computed tomography image of the patient's chest upon hospital admission.

autonomous, active and healthy; he was using a single medication, levothyroxine (188 mcg per day).

Treatment was begun with amoxicillin, clavulanate, azithromycin and vigorous intravenous hydration. After the pneumonia and electrolyte disorders were resolved, the patient underwent 3 surgeries for the sacral injury.

Near hospital discharge, the patient was diagnosed with COVID-19, with less than 25% lung involvement, which did not require invasive procedures. He remained a further 14 days in a unit for patients with COVID-19.

The patient's total hospital stay was 62 days and, due to mobility impairment, he was referred to a transitional care unit for rehabilitation. By the time he reached this new unit, he had lost 13% of his usual weight, had global muscle weakness, handgrip strength of 10 kgf, imbalance, and sarcopenia, in addition to a postoperative wound in the sacral region (Figure 2). After 25 days, he was discharged lucid and alert, having gained 5.2 kg, with good sphincter control and walking with little unilateral assistance.

TABLE 1. Results of the laboratory tests performed upon hospital admission.

Laboratory examination	Value	Reference values
Red blood cells (millions/mm ³)	5.08	4.3 to 5.7
Hemoglobin (g/dL)	15.9	12 to 17.7
Hematocrit (%)	45.8	35 to 50
Mean corpuscular volume (fL)	90.2	81 to 98
Mean corpuscular hemoglobin concentration (pg)	31.3	26 to 34
Leukocytes (mm ³)	17.200	3500 to 10500
Absolute neutrophils (mm ³)	14.688	1700 to 7000
Creatinine (mg/dL)	2.47	0.7 to 1.2
Urea (mg/dL)	230	19.3 to 42.8
Sodium (mmol/L)	153	137 to 145
C-reactive protein (mg/dL)	16.8	≤ 1.0
Thyroid stimulating hormone (uUI/mL)	48.67	0.35 to 5.5
Free thyroxine (ng/dL)	0.4	0.83 to 1.43
Blood culture	<i>Proteus mirabilis</i>	Negative

**FIGURE 2.** Postoperative wound in the sacral region upon admission to the care transition unit.

While hospitalized, the patient had a positive emotional attitude, remaining calm and confident, despite the severity of his clinical condition.

DISCUSSION

The main point of this case is that a positive outcome occurred after a dramatic and serious clinical condition in an individual of advanced age who had led an active life but was in a risky environment. His social network was large and close from an emotional point of view but had little power to intervene in emergency situations. We proposed to analyze the patient's trajectory from the point of view of physiological reserve through the concepts of intrinsic capacity and physical resilience.

In addition to genetic inheritance, the World Health Organization considers personality characteristics, disease burden, behaviors, health care skills, and lifestyle habits determinants of intrinsic capacity.¹ According to the patient's report, which was confirmed by his family, it can be inferred that, prior to hospitalization, he had high intrinsic capacity according to the World Health Organization's 5 domains,⁵ ie, preserved mobility, good sensory function, and excellent cognition and vitality, in addition to optimistic and participatory behavior.

When asked about things that, over the course of his life, positively influenced his intrinsic capacity, he highlighted regular jiu-jitsu training and aerobic exercise, such as running and walking, in addition to low alcohol consumption, good sleep patterns, a successful romantic life, good mood, high intellectual activity and low disease burden.

According to Chhetri et al.,⁶ physical resilience can only be defined without ambiguity when the "system, state, and stressor" triad is specified. According to this approach, considering the individual as the system, the state as survival,

and the stressor as a fall and its complications, it is clear that the patient in question was extremely resilient. However, the same conclusion can be reached if the muscular system is considered the “state”, since its function has almost completely recovered.

In summary, the patient’s trajectory can be understood as resulting from high intrinsic capacity prior to the stressful event, undoubtedly a measure of adequate physiological reserve.^{3,6} Likewise, the positive response to therapeutic interventions, especially functionality recovery after a long hospital stay, indicates a high level of physical resilience.^{3,6}

This clinical case helps us visualize the concepts of intrinsic capacity and physical resilience descriptively and factually. Although such concepts can reconfigure discussion about older adult health, approaching it through an individual’s

strength reserves against natural physiological wear and tear, its operationalization still lacks adequate instruments that can objectively describe such forces.^{8,9}

Conflict of interests

the authors declare no conflicts of interest.

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Author contributions

MP: writing – review & editing, visualization. BG: writing – original draft, investigation. FZ: writing – original draft, investigation. FLF: investigation. RAL: writing – review & editing, conceptualization, supervision.

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