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Research Article

Emotional Intelligence in AI-Mediated Neurology: A Narrative Neurocognitive Review

Ignacio Bonasa Alzuria*

Independent Researcher, Madrid, Spain.

ORCID ID: 0009-0001-3940-4278

Corresponding Author Information

Ignacio Bonasa Alzuria

Independent Researcher, Madrid, Spain.

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ABSTRACT

Artificial intelligence (AI) is rapidly moving from the periphery to the core of neurological practice, including image interpretation, risk stratification, cognitive screening, remote monitoring, and patient-facing communication. This technological transition creates a paradox: as algorithms become more proficient at detecting patterns, the distinctly human ability to recognize, interpret, regulate, and ethically respond to emotion becomes more rather than less important. This narrative review examines the importance of emotional intelligence (EI) in an AI-mediated world from a neurocognitive and neurological perspective. A targeted search of PubMed and Google Scholar was undertaken for English-language literature published between January 2020 and March 2026, with priority given to systematic reviews, meta-analyses, consensus statements, and clinically relevant studies in neurology, medicine, psychiatry, and digital health. Current evidence places EI within distributed brain systems involving the amygdala, insula, anterior cingulate cortex, and multiple prefrontal regions that support emotion recognition, salience assignment, ambiguity processing, self-regulation, and social cognition. In neurological care, EI is especially relevant because dementia, stroke, traumatic brain injury, Parkinson's disease, epilepsy, and other brain disorders often affect emotion recognition, empathy, insight, and caregiver relationships. At the same time, AI systems can simulate empathic language, improve access, and reduce administrative burden, but they may also encourage cognitive offloading, relational depersonalization, bias opacity, and overtrust in fluent outputs. We argue that EI should be treated as a trainable neurobehavioral competency and a clinical safeguard in the AI era. The future of humane neurology will depend not only on more accurate algorithms, but on clinicians, patients, and institutions that can combine AI literacy with emotional wisdom, reflective judgment, and ethical accountability.

KEYWORDS

Emotional intelligence, Artificial intelligence, Neurology, Neurocognition, Social cognition, Empathy, Clinical communication, Digital health.

Introduction

Artificial intelligence is no longer a futuristic add-on in medicine. In neurology and related brain sciences, it is already being deployed for neuroimaging interpretation, risk prediction, biomarker discovery, cognitive screening, speech and language analysis, decision support, and remote patient monitoring [1-3]. The pace of this integration is likely to accelerate, especially in areas characterized by large data streams, diagnostic uncertainty, and chronic follow-up. Neurology is therefore one of the disciplines in which the promises and perils of AI are becoming visible first.

Yet a persistent misunderstanding accompanies technological progress: the assumption that the rise of computational intelligence reduces the relevance of emotional intelligence. In reality, the

opposite is increasingly true. The more care is mediated by algorithms, templates, predictive models, and machine-generated language, the greater the need for clinicians to recognize distress, regulate their own responses, interpret ambiguity, and protect the moral quality of clinical encounters. In other words, AI can augment analysis, but it cannot replace the embodied, accountable, and relational dimensions of human care.

That distinction is particularly important in neurology. Neurological disorders frequently alter cognition, affect, self-awareness, and interpersonal functioning. Dementia and mild cognitive impairment can erode facial emotion recognition, empathy, and theory of mind [4,5]. Stroke and traumatic brain injury may impair emotional processing and social inference even when motor recovery is the dominant clinical focus [6,7]. Parkinson's disease and epilepsy likewise affect social cognition in ways that matter for communication, adherence, safety, and caregiver burden [8-10]. For these reasons, EI in neurology is not a decorative soft skill. It is part of the clinical infrastructure of humane and safe care.

Methods of this narrative review

This paper is a narrative review. A targeted literature search was performed using PubMed and Google Scholar for English-language sources published between January 2020 and March 2026, complemented by selective use of earlier foundational papers where they remained conceptually important. Search terms included combinations of "emotional intelligence", "emotion regulation", "social cognition", "empathy", "artificial intelligence", "neurology", "dementia", "stroke", "traumatic brain injury", "Parkinson's disease", "epilepsy", "medical education", and "doctor-patient relationship". Priority was given to systematic reviews, meta-analyses, consensus statements, and high-impact clinical or translational studies. The goal was not exhaustive quantitative synthesis, but a clinically oriented integration of evidence relevant to neurological care in AI-rich environments.

Emotional intelligence as a neurocognitive construct

Emotional intelligence is best understood not as inspirational rhetoric, but as a neurobehavioral construct involving at least four interdependent capacities: noticing emotion accurately, understanding what emotion signifies in context, using emotional information to guide decisions, and regulating responses adaptively [11]. Recent work has continued to strengthen the move away from vague trait-based descriptions toward ability-related and clinically actionable models of EI [11].

A 2026 systematic review on the neural correlates of EI concluded that emotional intelligence depends on a broad and distributed brain network rather than on a single emotional center [12]. Earlier lesion-based work remains highly informative here. Human lesion studies have shown that damage affecting the amygdala, ventromedial prefrontal cortex, insula, and anterior cingulate compromises abilities central to EI, including emotion recognition, emotional awareness, valuation, and social decision-making [13]. This matters because it places EI squarely inside mainstream neurocognitive architecture.

Emotion regulation research supports the same conclusion. Meta-analytic evidence demonstrates robust amygdala-prefrontal coupling during regulatory tasks, especially when people reinterpret emotionally charged stimuli through cognitive reappraisal [14]. Similarly, recent multimodal work on emotional ambiguity shows dynamic bidirectional interactions between amygdala and prefrontal systems during the interpretation of uncertain facial expressions [15]. In clinical practice, these mechanisms underpin tolerance of uncertainty, modulation of fear and frustration, and the capacity to remain cognitively organized while facing emotionally dense information.

From a neurological standpoint, EI can therefore be framed as a functional expression of intact social-cognitive and self-regulatory networks. This framing is useful because it avoids reducing EI to personality preference. It also clarifies why EI becomes clinically fragile in disorders that affect frontal systems, limbic regulation, executive function, or social-cognitive processing.

Table 1: Review design and evidence-selection framework.

Item	Details
Review type	Targeted narrative review focused on clinically relevant evidence for neurology, neurocognition, and AI-mediated care.
Sources searched	PubMed and Google Scholar, with preference for peer-reviewed journals and consensus documents.
Time window	January 2020 to March 2026, plus selected earlier foundational papers where conceptually necessary.
Core concepts	Emotional intelligence, emotion regulation, empathy, social cognition, artificial intelligence, neurology, neurocognitive disorders, stroke, traumatic brain injury, Parkinson's disease, epilepsy, medical education, and doctor-patient relationship.
Evidence prioritized	Systematic reviews, meta-analyses, consensus statements, narrative reviews of direct clinical relevance, and illustrative primary studies.
Purpose of synthesis	To clarify why emotional intelligence remains clinically indispensable as AI becomes more embedded in neurological diagnosis, monitoring, communication, and decision support.

Why AI raises rather than lowers the value of emotional intelligence

AI does not enter a social vacuum. It changes how people attend, infer, trust, decide, and relate. Social neuroscience shows that the human brain does not process interactions with artificial agents in exactly the same way that it processes interactions with other humans. Harris has argued that social perception and decision-making recruit partially different neural and motivational patterns when the perceived social partner is an AI rather than a person [1]. This does not mean human-AI interactions are unreal; it means they are psychologically and neurally distinct.

That distinction is crucial in medicine because many contemporary

AI systems are linguistically fluent and can appear calm, validating, and empathic. Studies comparing AI-generated and clinician-generated responses show that patients may perceive chatbot outputs as highly empathic, and sometimes even more empathic than physician responses in constrained settings [16,17]. These findings are important, but they must be interpreted carefully. Perceived empathy is not the same as accountable empathy. A system can reproduce the style of warmth without carrying responsibility for its effects, without sharing uncertainty, and without participating in the relational reciprocity that underpins medical care.

AI also introduces an epistemic challenge. High-performing systems often generate outputs that are persuasive before they are fully transparent. In the context of cognition research and clinical decision support, this has increased interest in explainable AI, precisely because opaque systems can distort trust, encourage overreliance, and make error correction more difficult [18]. When this opacity intersects with emotionally vulnerable patients or families, the stakes are even higher. Emotional intelligence becomes the human faculty that asks not only "Is this output accurate?" but also "How will this be received?", "What emotional harm could it cause?" and "What must remain non-delegable to a person?".

Clinical relevance in neurology

Dementia and mild cognitive impairment

Neurology is uniquely sensitive to these issues because many neurological disorders alter the very capacities that support social understanding. In dementia and mild cognitive impairment, social cognition is not a marginal domain. A 2025 systematic review and meta-analysis found impairments across emotion recognition, theory of mind, and empathy, with greater deficits in dementia than in milder conditions [4]. More recently, the SIGNATURE initiative published international recommendations emphasizing that social cognition should be assessed more systematically in neurocognitive disorders because it affects diagnosis, symptom interpretation, behavior change, and real-world care [5]. These data have two implications. First, clinicians should not assume that the patient or caregiver can accurately interpret emotionally nuanced information delivered by a digital system. Second, EI is indispensable when discussing prognosis, loss of autonomy, behavioral symptoms, driving, medication adherence, institutionalization, and caregiver strain. An AI-generated summary may organize facts efficiently, but it cannot judge how much grief, shame, denial, or anticipatory fear is entering the room.

Stroke and acquired brain injury

After stroke and acquired brain injury, social-cognitive disturbance often remains under-recognized because clinical attention tends to focus on language, mobility, and executive deficits. However, a 2025 scoping review reported that stroke survivors commonly show impairments in emotion recognition, empathy, and theory of mind, while the field still lacks targeted rehabilitation pathways for these deficits [6]. Similarly, a 2025 systematic review and meta-analysis on moderate-to-severe traumatic brain injury concluded that interventions for social-cognitive difficulties can be beneficial, although the evidence base remains heterogeneous and still developing [7].

These findings matter for AI implementation. When patients have subtle impairments in interpreting emotion, sarcasm, reassurance, or nuance, digitally mediated communication can be misunderstood even when its wording appears clear. EI enables the clinician to detect mismatch between what was said and what was actually received. It also helps determine when the efficiency gains of AI should yield to slower, face-to-face clarification.

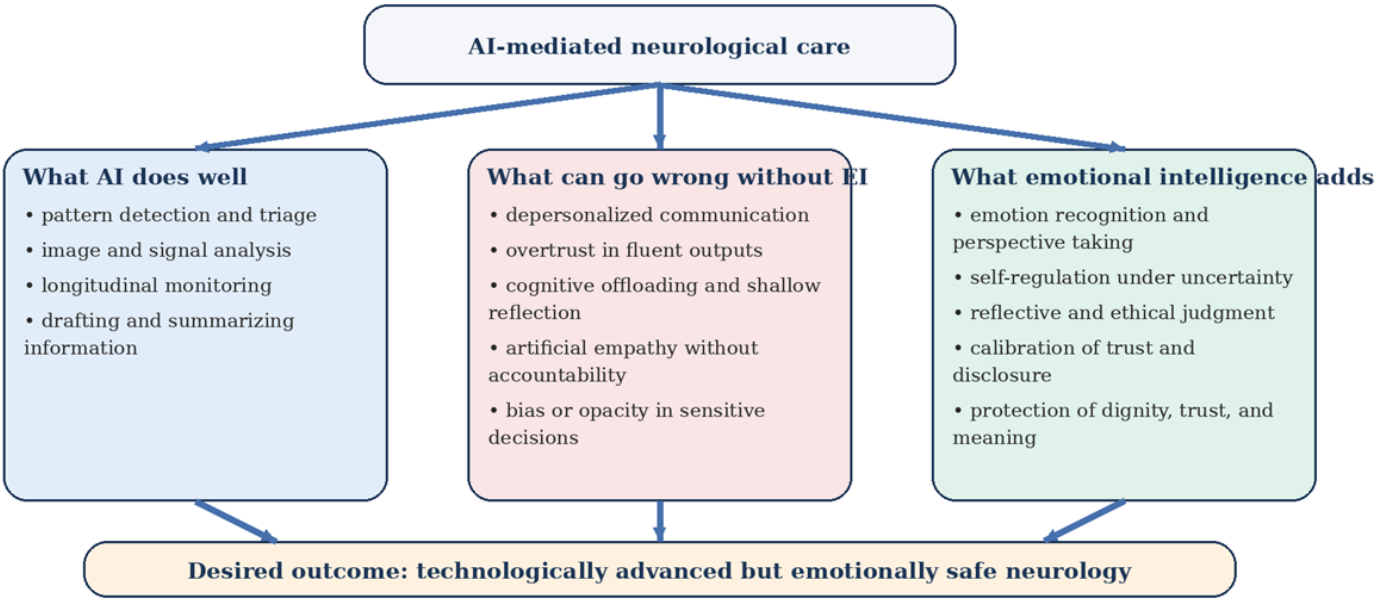

Figure 1: Emotional intelligence functions as the human safeguard that converts AI capability into clinically humane neurological care.

Parkinson's disease and epilepsy

Social cognition is also clinically relevant in movement disorders and epilepsy. In Parkinson's disease, recent work suggests that dispositional empathy may remain relatively preserved while situational empathy declines with cognitive impairment, implying that real-time empathic understanding is especially vulnerable as cognition worsens [8]. Temporal lobe epilepsy has likewise been associated with impaired affective prosody recognition and deficits in dynamic facial emotion recognition, suggesting modality-independent difficulties in decoding emotional cues [9]. A meta-analysis in adults with epilepsy further supports impairments in theory of mind and some empathy-related processes [10].

These disorders illustrate why neurologists cannot outsource the emotional dimension of communication. If a patient has reduced capacity to decode prosody, mentalize another person's perspective, or track complex social cues, then AI-mediated interaction may feel efficient while remaining clinically incomplete. In these settings, EI is not simply empathy in a moral sense; it is a compensatory clinical skill that helps preserve understanding when disease weakens the patient's own social-cognitive resources.

Caregiver burden, trust, and relationship continuity

Neurological illness is rarely contained within the patient alone. Caregivers absorb uncertainty, anticipatory grief, behavioral change, treatment fatigue, and role strain over long periods. Because AI tools often optimize around information delivery and workflow efficiency, they can miss the relational ripple effects of disease. EI helps clinicians recognize the caregiver who asks a technical question but is actually expressing exhaustion; the family member who resists technology because they fear losing human contact; or the patient whose apparent nonadherence reflects shame rather than lack of comprehension.

Evidence from the wider clinical literature

Beyond neurology-specific populations, the broader medical literature reinforces the clinical value of EI-rich practice. A 2024 systematic review in physicians, residents, and medical students linked higher EI with better communication, reduced burnout, and stronger professional functioning [19]. A large review of empathy in health care likewise found consistent associations with patient experience, care quality, and provider performance [20]. Randomized-trial evidence further indicates that practitioner empathy can improve patient satisfaction [21]. These data do not imply that EI is a cure-all, but they do show that emotionally intelligent care is measurable, consequential, and relevant to outcomes that matter.

Artificial empathy, cognitive offloading, and emotional deskilling

Another reason EI matters more in the AI era is that digital convenience can encourage cognitive offloading. Emerging evidence suggests that frequent reliance on AI tools may reduce engagement in critical thinking through delegation of analytic work to external systems [25]. This concern should not be exaggerated into technophobia, but neither should it be dismissed. In clinical environments, fluency can create an illusion of understanding. A well-written AI summary can make a case feel cognitively settled before the clinician has done the harder work of contextual interpretation.

EI serves as a counterweight to this drift because emotionally intelligent clinicians are more likely to notice stress, urgency, avoidance, defensiveness, overconfidence, and validation-seeking in themselves and others. They are better positioned to ask reflective questions such as: Am I accepting this recommendation because it is sound, or because I am cognitively overloaded? Am I using this

Table 2: Neurological situations in which emotional intelligence remains indispensable despite AI support.

Clinical scenario	What AI may contribute	What can be missed without EI	Why EI matters
Dementia / MCI	Screening support, pattern detection, summaries, remote monitoring	Fear, denial, shame, fluctuating comprehension, caregiver distress	EI helps calibrate how much information to deliver, when to pause, and how to preserve dignity [4,5].
Stroke / acquired brain injury	Outcome prediction, documentation support, telerehabilitation	Subtle deficits in emotion recognition or theory of mind	EI helps detect mismatch between apparent understanding and real understanding [6,7].
Parkinson's disease / epilepsy	Longitudinal tracking, symptom prompts, patient education	Prosody, situational empathy, and social-cognitive decoding deficits	EI provides compensatory communication when disease reduces social-cognitive flexibility [8-10].
High-stakes consultations	Efficient drafting and information organization	Overreassurance, depersonalization, avoidance of emotional labor	EI protects reflective judgment during bad-news, uncertainty, and end-of-life discussions [19-21].
Patient-facing AI tools	Availability, triage, symptom checking, emotional style mimicry	Artificial empathy, bias opacity, misplaced trust	EI distinguishes fluent simulation from accountable care and decides when human intervention is mandatory [16-18,22-27].

chatbot reply because it improves care, or because I want to avoid the emotional labor of a difficult conversation? In this sense, EI protects against both cold overreliance and sentimental overtrust.

Artificial empathy sharpens the issue further. Recent reviews describe rapid progress in systems that detect, model, and respond to human emotion through language, voice, physiology, or behavior [22,23]. These technologies may improve access, triage, and engagement, particularly in settings with workforce shortages. But they also risk reducing complex affective states to computational labels, reinforcing bias, and encouraging a form of simulated care that sounds caring while remaining thinly accountable. Here too, EI is the interpretive filter that prevents technical sophistication from being confused with humane adequacy.

Educational and institutional implications

The educational implications are immediate. EI is trainable. A 2024 systematic review and meta-analysis found that EI training among healthcare workers can produce meaningful gains across studies [28]. Systematic reviews in medical education similarly report that longitudinal, multifaceted interventions can improve EI-related capabilities and professional development [29]. Balint-group interventions also appear to strengthen empathy in medical and nursing education when implemented with sufficient continuity [30].

These findings suggest that neurology training programs should treat EI and AI literacy as complementary rather than competing curricula. The clinician of the near future will need to read scans and models, but also decode silence, grief, confusion, resistance, and misplaced reassurance. Training should therefore include supervised difficult-conversation practice, reflective writing, debriefing after emotionally intense encounters, perspective-taking exercises, communication feedback, and explicit discussion of when AI-generated communication is appropriate, insufficient, or unsafe. Importantly, self-perceived empathy may not map neatly onto actual emotion-recognition ability, as observational work in nurses has shown [31]. This makes structured feedback and deliberate practice more valuable than self-assurance alone.

Institutions also need governance, not merely adoption. Patient-centered AI requires transparency, escalation protocols, and clear accountability. Ethical analyses of the doctor-patient-AI relationship increasingly emphasize that the integration of AI can either support patient-centered care or weaken it, depending on how responsibility, disclosure, and trust are handled [26,27]. Neurology services should therefore define which interactions may be safely mediated by AI, which require mandatory human review, and which should remain exclusively human because of emotional, ethical, or decisional gravity.

Research agenda

Future research should move beyond asking whether AI can mimic empathy and toward asking when empathy must remain embodied, accountable, and relational. Several priorities stand out. First, clinical studies should test whether EI moderates clinician overreliance on algorithmic recommendations and patient trust in automated outputs. Second, neurological cohorts should be used to identify which disease-related impairments most strongly disrupt the safe use of emotionally adaptive technologies. Third, implementation studies should compare AI-supported pathways with and without structured EI training for clinicians.

Research should also better integrate social cognition into routine neurological outcomes. The evidence base already shows that emotion recognition and empathy are clinically meaningful rather than secondary curiosities [4-10]. If future AI systems are intended to communicate with neurologically vulnerable populations, their evaluation should include not only accuracy and efficiency but also comprehensibility, emotional safety, caregiver impact, and preservation of trust.

Conclusion

In an era captivated by machine intelligence, emotional intelligence should be understood as a form of clinical intelligence that becomes more valuable as automation expands. Neurology demonstrates this with particular clarity. Brain disorders frequently damage social cognition, alter emotional processing, and intensify the relational demands of care, while AI simultaneously increases both analytical capacity and the risk of depersonalized interaction. Seen in this light, EI is not the opposite of technological progress; it is the condition that allows technological progress to remain humane. The future of neurological care will be strongest where AI performs pattern recognition, while emotionally intelligent clinicians preserve meaning, trust, judgment, and dignity.

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