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Neuroanatomical Specificity in Reporting & Diagnosing Neurolinguistic Disorders: A Functional & Ethical Primer

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Abstract : Introduction: This critical analysis aims to ascertain how well neuroanatomical aetiologies are communicated within 20 case reports of aphasia. Neuroanatomical visualisations based on dissected brain specimens were produced and combined with white matter tract and vascular taxonomies of function in order to address the most consistently underreported features found within the aphasic case study reports. Together, these approaches are intended to integrate aphasiological knowledge from the past 20 years with aphasiological diagnostics, and to act as prototypal resources for both researchers and clinical professionals. The medico-legal precedent for aphasia diagnostics under Canadian, US and UK case law and the neuroimaging/neurological diagnostics relative to the functional capacity of aphasic patients are discussed in relation to the major findings of the literary analysis, neuroimaging protocols in clinical use today, and the neuroanatomical aetiologies of different aphasias. Basic Methodology: Literature searches of relevant scientific databases (e.g, OVID medline) were carried out using search terms such as aphasia case study (year) & stroke induced aphasia case study. A series of 7 diagnostic reporting criteria were formulated, and the resulting case studies were scored / 7 alongside clinical stroke criteria. In order to focus on the diagnostic assessment of the patient's condition, only the case report proper (not the discussion) was used to quantify results. Statistical testing established if specific reporting criteria were associated with higher overall scores and potentially inferable increases in quality of reporting. Statistical testing of whether criteria scores were associated with an unclear/adjusted diagnosis were also tested, as well as the probability of a given criterion deviating from an expected estimate. Major Findings: The quantitative analysis of neuroanatomically driven diagnostics in case studies of aphasia revealed particularly low scores in the connection of neuroanatomical functions to aphasiological assessment (10%), and in the inclusion of white matter tracts within neuroimaging or assessment diagnostics (30%). Case studies which included clinical mention of white matter tracts within the report itself were distributed among higher scoring cases, as were case studies which (as clinically indicated) related the affected vascular region to the brain parenchyma of the language network. Concluding Statement: These findings indicate that certain neuroanatomical functions are integrated less often within the patient report than others, despite a precedent for well-integrated neuroanatomical aphasiology also being found among the case studies sampled, and despite these functions being clinically essential in diagnostic neuroimaging and aphasiological assessment. Therefore, ultimately the integration and specificity of aetiological neuroanatomy may contribute positively to the capacity and autonomy of aphasic patients as well as their clinicians. The integration of a full aetiological neuroanatomy within the reporting of aphasias may improve patient outcomes and sustain autonomy in the event of medico-ethical investigation.

Keywords : aphasia, language network, functional neuroanatomy, aphasiological diagnostics, medico-legal ethics
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