Historical Note

An Episode in the History of Temporal Lobe Epilepsy:
The Quadrennial Meeting of the ILAE in 1953

On September 7, 1953, the quadrennial meeting of the ILAE was held in Lisbon, as was customary at that time in association with the International Neurological Congress. In those days, the congress of the League was a single-day affair, and on this occasion, was devoted entirely to the subject of the temporal epilepsies. This was a landmark meeting in the evolution of thought on temporal lobe epilepsy. The subject had only begun to attract research or clinical attention in the preceding 5 years, and the Lisbon meeting had the effect of placing it firmly at the center of contemporary clinical and research interest. As this issue of Epilepsia is also focused on temporal lobe epilepsy, it seemed timely to devote an historical note to the Lisbon meeting and to reflect on where knowledge has advanced (or not) in the half-century since the Lisbon congress was held.

The meeting was conceived and convened by Henri Gastaut, the new ILAE President-elect, who had by his own admission devoted all his activities in the previous 5 years to the study of the temporal epilepsies. The meeting took an interesting form, and perhaps one that the ILAE might consider resuscitating. It consisted primarily of a consideration of a detailed manuscript, written by Gastaut, and entitled So-called “Psychomotor” and “Temporal” Epilepsy. The manuscript was precirculated to 20 important figures in the field (discussants), who sent in written commentaries and some of whom also attended the meeting. The manuscript and the discussants’ written comments were then presented at the meeting for open discussion. The original manuscript and commentaries were published in Epilepsia (1) and make fascinating reading. These 1953 Epilepsia articles were very influential, defining the direction and scope of research in this area for the next few decades and mapping out issues that still remain topical today. Indeed, the spirit of this earlier meeting can still be detected stalking the pages of this current issue of Epilepsia.

Gastaut’s article is an impressive work. After an introduction and historical review, the article is divided into a six sections, which Gastaut called critical studies. These were summaries of contemporary knowledge augmented by Gastaut’s own data, and covered the following areas: clinical symptoms; electroencephalographic symptoms; correlations between the clinical and electroencephalographic symptoms; surgical anatomical findings; pathogenesis; and methods of treatment. The article was then concluded by a review of experimentally induced attacks of psychomotor or temporal epilepsy.

One emphasis of the article is, as one would expect from the period and the author, on classification and terminology. The relative merits of the terms psychomotor and temporal seizures were debated, and as Merlis in his closing remarks acutely observed:

This is not a matter of semantic pedantry, but represents significant differences in orientation, observation, and interpretation of the complex seizures variously referred to as psychomotor, psychomotor triad, temporal lobe, uncinate group, psychic equivalents, autonomic, diencephalic, etc.

The second unsurprising emphasis was on electroencephalography, a relatively new discipline that had been of the greatest importance in delineating the field. The three critical studies of clinical and electroencephalographic symptoms, and their correlations, are masterly accounts of the clinical and EEG (ictal and interictal) features of temporal lobe epilepsy. Fifty years later, there is really very little to add, and what knowledge has been accrued in this interval is incremental at best. The EEG findings from scalp recordings, electrocorticography, and depth recordings were described, and Gastaut based his ictal observations mainly on the use of intravenous metrazol. This technique allowed him the luxury of direct observation of seizures, unusual in this period before EEG telemetry technology. He claimed that the information derived from metrazol-induced seizures was equivalent clinically and electrographically to that from spontaneous seizures and could be used to direct surgical therapy. Certain aspects of Gastaut’s article work are not of particular emphasis today; for instance, his trenchant refutation of the then prevalent tendency to consider “psychomotor” epilepsy as always “temporal” epilepsy, and his reflections on whether the automatisms of TLE were ictal.
or postictal in nature. The critical study of the surgical anatomical findings places “incisural sclerosis” at the centre of interest (the term was coined by Penfield in 1952, and Gastaut’s use reflects his agreement with Penfield’s view on pathogenesis).

However, Gastaut was at pains to point out that the electrographic discharges, recorded both from the scalp and during surgery, are widespread and that the epileptogenic network is wide and often at a distance from the temporal lobe. In the critical study of pathogenesis, Gastaut’s views on the importance of trauma diverge from those of today. He believed that trauma was the commonest cause of temporal lobe epilepsy (50% of cases), resulting in contusion damage to the brain as it was compressed against the sphenoid bone or the free edge of the tentorium. He viewed encephalitis as the second most frequent cause (20–25% of cases). The third cause (5% of cases) was obstetrical injury, which in Gastaut’s view resulted in herniation of the temporal lobe over the tentorial edge, causing vascular compression of the anterior choroidal (and other) arteries. The consequential ischemia was thought to be responsible for incisural sclerosis (2). A relation to febrile seizures was not mentioned, although Gastaut adopted the view that early childhood events led to later epilepsy. He clearly understood that the sclerotic lesion was causal, contrary to the classic opinion of Spielmeyer, still widely held at that time, that the lesion was a consequence of seizures and not their cause. The critical study of the methods of treatment is interesting mainly for its summary of surgical therapy. Anterior temporal lobectomy, guided by EEG, had been practiced since 1939, but had been widely adopted only during the previous 5 or so years (3). Gastaut reported that about 50% of patients were rendered free of seizures, but he realized (not least from the frequent postoperative persistence of EEG spikes) that even a generous temporal lobectomy did not remove all the epileptogenic tissue or network, although it could remove enough to halt clinical seizures. This is an important conclusion, often neglected today, by some who adopt the simplistic view that the “hippocampal sclerosis” is, itself, the epileptic “focus.”

The final section of the article is devoted to a review of experimentally induced attacks of psychomotor or temporal epilepsy. This again is a superb summary of contemporary experimental work, deriving mainly from the stimulation experiments in unanesthetized cats and from the aluminum oxide lesioning experiments carried out by Gastaut and his colleagues (4–6). Gastaut points out that stimulation in many limbic and diencephalic structures regions can result in psychomotor seizures. However, lesional epilepsy (in contrast to electrographic discharges) is consistently produced only when the lesions are localized in the pyriform cortex, amygdale, or hippocampus. Gastaut also refers to the neuronographic and histologic work of others in defining the connections of the mesial temporal structures that he viewed as the anatomic basis of epileptogenesis.

Gastaut finally proposed a clinico-EEG-pathogenic classification of psychomotor epilepsy based on anatomic origin. He recognized three types: temporal neocortical epilepsy (true temporal epilepsy; rare); hippocampal and parahippocampal psychomotor epilepsy (common); and diencephalic psychomotor epilepsy (intermediate in frequency). This classification, which Gastaut himself called rough and doubtful, has not really stood the test of time, but his recognition of the fact of wide networks underpinning psychomotor seizures has done so. The attempted differentiation of mesial and lateral temporal lobe seizures remains a modern question, and several abortive and failed attempts have occurred over the years since Gastaut to define features that allow a distinction to be made (for instance, work from Yale, UCLA, and Zurich). The focus on rhinencephalic rather than neocortical structures was an undoubted conceptual advance and was further elaborated in a subsequent article a few months later (7).

The published commentaries by 17 senior figures included in the 1953 issue of Epilepsia are equally interesting. This discussion section is opened by Murry Falconer, who reported the results of his first 19 en bloc temporal lobectomies, carried out over the previous 2 years (and including one repeated operation) using clinical and interictal EEG data for localization. He reported that 70% of the patients were rendered seizure free, and emphasised both the causal nature of incisural sclerosis and also the need to resect hippocampus as well as temporal neocortex; points that are now fully accepted. The next commentary was that of Gibbs. In his historical review, Gastaut had made a point of disagreeing with Gibbs in relation to terminology and anatomic localization, and this divergence of opinion is highlighted in the commentary. Gibbs, remarkably from today’s perspective, given his preeminence in the field, reiterated his belief that in most cases, the temporal neocortex, and not the mesial structures, was the epileptic focus. Gastaut fiercely contested this untenable view. Two other less important points of disagreement were made: first was Gibb’s view that the metrazol test was unreliable for purposes of localization; this debate is still unresolved; second, Gibbs emphasised the importance of sleep in determining the location and presence of anterior temporal spikes, a now indisputable point and one surprisingly ignored by Gastaut. In his commentary, Herbert Jasper, whose discovery of the association of the psychomotor seizure and temporal spiking (8) underpinned Penfield’s operative work, reiterated Gastaut’s emphasis on the anatomically widely distributed nature of the epileptogenic area. Jasper stated that, from the physiological point of view, the periamygdaloid and rhinencephalic portions of the temporal lobe, including the extent of the hippocampal gyri and often the pes hippocampi,
are nearly always severely affected in patients with temporal lobe seizures. Margaret Lennox concurred with this distributive view, as did John Fulton, who further suggested that the “temporal lobe seizure” might be better designated “the limbic seizure” in view of the wide physiologic involvement of limbic structures. Paul McLean, himself the originator of the concept of the “limbic system,” also was a discussant and postulated that involvement of limbic structures was responsible for epileptic behavior and also the amnesia of the psychomotor seizure. Amnesia was surprisingly absent from Gastaut’s considerations, as William Lennox pointed out. Lennox’s commentary is also interesting for providing the only mention of febrile seizures as the cause of the brain lesion responsible for psychomotor seizures. Lennox also doubted, correctly as it now turns out, that it was possible to subclassify seizures anatomically within the temporal lobe, as he put it:

The brain is too complicated and too well integrated to contain even a phase of epilepsy within a certain brain compartment.

The most detailed commentary was that of K.W.E. Paine from London, who had reviewed the results of the 68 temporal lobectomies carried out by Wilder Penfield between the years 1945 and 1950. Most of the points he makes and the conclusions he draws remain relevant today and have been little advanced, in spite of the massive surgical literature in the intervening 50 years. He defined a successful postoperative outcome as one in which fewer than three postoperative seizures (excluding auras, which were recognized to be a common sequela) occurred in the patients who had been followed up for between 1 and 7 years (>60% for ≥3 years). Forty-seven percent of Penfield’s operated-on cases had a successful outcome by this definition, a finding not far short of the results of surgery today. Paine pointed out that only a 60% success rate was found, even in patients with ideal preoperative findings. Successful results were more common in those patients with unilateral interictal temporal spiking, and none of the four patients with bilateral independent spikes did well. His list of operative complications is instructive: two postoperative hematomas with death in one case, upper quadrantic hemianopia in about one fourth of cases, persistent aphasias with death in one case, upper quadrantic hemiparesis. Paine pointed out that only a 60% success rate was found, even in patients with ideal preoperative findings. Successful results were more common in those patients with unilateral interictal temporal spiking, and none of the four patients with bilateral independent spikes did well. His list of operative complications is instructive: two postoperative hematomas with death in one case, upper quadrantic hemianopia in about one fourth of cases, persistent aphasia in one patient, memory deficit in 30% of patients, and severe disabling amnesia in one. Surgery is safer today even if not much more successful.

One point not mentioned in Gastaut’s review concerned the mental status of patients postoperatively. Paine records that five patients were in mental hospitals at the time of follow-up (all dominant temporal resections) and that mental deterioration is a definite risk of surgery. Like other discussants, Paine disagreed with Gastaut about etiology, finding trauma and encephalitis to be rare. He concluded his commentary by hoping for less-mutilating therapy, as he put it:

No, the treatment of temporal lobe seizures is hampered by our considerable ignorance of the mechanisms of epilepsy, temporal or otherwise. Excision of abnormal brain can be only a temporary phase in treatment.

Penfield was himself not present in Lisbon, but he sent in written comments, reiterating his pathogenic theory of incisural sclerosis. Robert Schwab made the interesting proposition that the seizure phenomenology was a reiteration of learned patterns of behavior and proposed the term acquired patterned motor and sensory epilepsy (or its Latin or Greek equivalent!) in place of temporal lobe epilepsy, a proposal unsurprisingly not widely adopted.

This must have been an extraordinary meeting; few conferences in epilepsy can have been so productive or influential, and few had so successfully brought together the views of the intellectual leaders of the field. Most of their conclusions remain uncontested, most of their controversies are unresolved, and most of their cautions should still be heeded. We can learn much, particularly from the unanimous rejection of the view that temporal lobe epilepsy is highly localized (a mistaken view often repeated today), and from the detailed neurophysiology that was presented. The importance of what we would now refer to as a neural network underpinning the seizures was fully recognized, as was the diffuse nature of the network involving rhinencephalic, diencephalic, and neocortical structures, spread anatomically well beyond any lesion such as “incisural sclerosis.” What was perhaps most missing from the congress was a neuropsychological perspective (although Paine mentioned that Brenda Milner was currently studying this) or a discussion of psychopathology, which is an area still very poorly understood. Not much is redundant, although clearly the simple visualization of hippocampal atrophy by volumetric MRI, perhaps the only really fundamental clinical advance in the 50 years, has rendered EEG examination less crucial. There was no neurochemistry, cellular neurophysiology, or molecular biology. Here contemporary research is making great strides, and one suspects it will be advances from these disciplines that finally consign the contributions from this conference into historical obscurity.

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REFERENCES


