Review

Postictal psychosis

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Abstract

Postictal psychoses represent a considerable clinical challenge and are often unrecognized. In this review, the clinical features of the syndromes and the underlying biological foundations, as revealed through EEG and imaging studies, are discussed. It is concluded that although the syndrome can be well recognized, it is not acknowledged in standard diagnostic manuals, hence the relative neglect in the epilepsy literature.

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1. Introduction

The most common and well-investigated peri-ictal psychosis is postictal psychosis (PIP), which is thought to account for a quarter of the cases of psychosis in epilepsy [1,2]. The incidence and prevalence of PIP are not known; however, more recent estimates of up to 18% have been reported in patients with medically intractable focal epilepsy [3,4]. Despite the frequency of its occurrence in clinical practice, it is frequently not diagnosed, and its characteristic features are not recognized by many who look after patients with epilepsy. In certain populations, for example those with learning disability, postictal psychosis can lead to very difficult management problems, which could be avoided if the diagnosis is recognized.

In 1988, Logsdail and Toone set down operational criteria [5] for the diagnosis of PIP, which have been widely accepted:

1. Onset of confusion or psychosis within 1 week of the return of apparently normal mental function
2. Duration of 1 day to 3 months
3. Mental state characterized by:
   a. Clouding of consciousness, disorientation, or delirium
   b. Delusions or hallucinations, in clear consciousness
   c. A mixture of (a) and (b)
4. No evidence of factors, which may have contributed to the abnormal mental state:
   a. Anticonvulsant toxicity
   b. A previous history of interictal psychosis

The authors described a series of 14 patients who fulfilled these criteria with a mean age at onset of epilepsy of 16.7 years and mean age at onset of psychosis of 32.2 years. The gap between onset of epilepsy and psychosis ranged from 3 to 33 years (mean = 15.5). The details within the article have hardly been bettered, with the singular exception of not emphasizing the lucid interval within diagnostic criteria. However, investigations into the disorder have not progressed much, in view of the difficulties of conducting acute studies in psychotic patients and the often retrospective nature of the diagnosis. As Kanemoto has remarked, most of the descriptions of the disorder were written by French and German neuropsychiatrists in the 19th century [2].

There have been several case reports and studies of patients with episodes of PIP, and an increase in the number of these episodes because of their precipitation on intensive monitoring units when antiseizure medications are stopped to induce seizures. Kanner et al. gave a figure of 7.8% for the incidence of PIP on their monitoring unit [4].

2. Clinical features and phenomenology of postictal psychosis

In most studies, PIP develops in patients with complex partial seizures (CPS), often with secondary generalization, and often follows a cluster of attacks or a seizure type (e.g., generalized) that is not the patient’s usual seizure type [3, 6–8]. However, PIP has also been described in patients with primary generalised epilepsy (PGE) [5, 8]. There tends to be a delay between the onset of habitual seizures and the development of PIP ranging from 1 month to 56 years [8], with a mean ranging from 13.1 [4] to 21.7 years [8].

Most reports document a “lucid interval” between the restoration of apparent “normal mental state” following the seizure and the beginning of postictal psychosis.
of the psychosis, which could last up to 72 hours and rarely longer [4, 5, 8–13]. This interval is one of the characteristic features of the syndrome, and yet it leads to clinical confusion. Typically the PIP emerges from a period of relative quiescence. The patient may appear normal, perhaps more subdued and perhaps a bit perplexed or even mildly confused [5, 11]. On asking the carer or relative if the patient had a seizure before the psychosis, the answer may be that the patient had not had a seizure for a few days. Any connection of the psychosis with the seizure then is dismissed, whereas this feature is prototypical. It is not invariably present, but when it is, the diagnosis is more secure.

The duration of the PIP ranges widely, from 1 to 90 days in the study of Logsdail and Toone [5], with a mean duration varying from approximately 3 days [4, 8] to 14.3 days [5]. The duration is likely to be longer in those patients with intellectual limitations.

The phenomenology of PIP appears to vary widely both within and between series. Logsdail and Toone [5] found that only one patient had primary delusions and thought disorder; nine had an abnormal mood, and six had paranoid delusions. Hallucinations were mainly visual and auditory. Savard et al. [10] reported that seven of nine patients developed a paranoid delusional syndrome with prominent persecutory delusions. Six patients had additional generalized seizures while psychic, and five of these experienced deterioration in psychotic symptomatology. Lancman et al. [12] described paranoid delusions, mysticism, and religious preoccupations along with auditory and visual hallucinations. They noted that in most cases, the patients could recall what had happened during the psychotic episodes. Devinsky et al. [8] documented fluctuating combinations of delirium, persecutory delusions, hallucinations, and affective changes. Kanner et al. [4] reported that most patients exhibited an abnormal affect, depression in 90% alternating with hypomania in 70%. Seventy percent were irritable and 20% had suicidal ideation. Delusions were experienced by 90% (paranoid, grandiose, somatic, and religious) and hallucinations by 40% (mainly auditory). All patients were oriented except in 7%, place, and person. Kanemoto et al. [13] described sexual indiscretions and sudden unprovoked aggressive behavior along with religious and grandiose delusions in patients with PIP.

In a later study, Kanemoto et al. [14] compared 30 patients with PIP with 33 patients with acute interictal psychosis. Well-directed violent attacks were observed in 13 of the 57 episodes of psychosis witnessed in the patients with PIP (23%) compared with only 3 of the 62 witnessed episodes of acute interictal psychosis (5%). Kanemoto and colleagues highlighted observations embedded in 19th-century literature on violent episodes in PIP: “This may be provoked by minimal provocation, or erupt suddenly with consequent self-harm or harm to others. The situation is the more concerning since the mental state is usually associated with clear or relatively clear consciousness, as opposed to the confusion of the immediate postictal state, characterized by confusion. This clinically is a dangerous situation and suicide in the PIP is one of the reasons why suicide is increased in patients with epilepsy above the population norm.”

Two other characteristic clinical features are religious delusions and a fear of impending death. These often go together, and their occurrence in people with epilepsy has been recognized since the 19th century. Religious delusions are reported in up to 25% of patients with PIP, but in only 2% of those with interictal psychoses [15].

Using depth electrodes, So et al. [9] noted increased medial temporal spiking, a finding not confirmed by Mathern et al. [16]. Other studies of depth recordings in single cases have not contributed additional information [2].

Several studies have revealed a significant association between PIP and bilateral independent interictal and ictal foci [3, 4, 6–8]. In fact, one study suggested that the occurrence of PIP was associated with an 89% likelihood of bilateral independent ictal foci [6, 7]. Accordingly, when PIP occurs in the middle of a video/EEG monitoring study that is part of a presurgical evaluation and all seizures were recorded from only one focus, it is recommended that the patient undergo a second study to confirm a unilateral source of epileptic seizures. Conversely, patients who, in the course of a video/EEG monitoring study, experience secondarily generalized tonic–clonic seizures should be carefully watched for the occurrence of PIP in the week following the last seizure.

3.3. Imaging studies

One group has performed SPECT studies in two patients who experienced episodes of PIP while being assessed for epilepsy surgery [17]. In both cases, increased regional blood flow (compared with interictal studies) was observed over the right temporal neocortex and the contralateral basal ganglia. In both cases, the ictal EEG confirmed a right temporal focus.

There have been several other studies using SPECT, but the sample sizes have been small. In a review of the data including several of his own cases, Kanemoto [2] reported that, independent of the side of the pathology, relative hyperactivity was shown in the right temporal and frontal lobes.

Briellmann et al. [18] compared the volume of the hippocampus (assessed using quantitative MRI) between six patients with PIP (five of whom had a left-sided focus) and 45 controls with medically intractable temporal lobe epilepsy. Although the overall volumes and hippocampal T2 relaxometry were similar, the patients with PIP demonstrated relative sparing of the anterior hippocampus (whereas the controls had diffuse hippocampal loss). In addition, histopathological examination of the resected temporal lobes revealed that mesial dysplasia was more frequent in the patients with PIP.

Tebartz van Elst et al. [19] reported quantitative MRI studies of the amygdala and hippocampus in PIP, noting increases in amygdala volumes bilaterally, but detected no hippocampal volume changes.

4. Prognosis

There have been few long-term follow-up studies; however, PIP would appear to be recurrent, often in a stereotypic way [5, 10, 12] and some patients (up to 25%) go on to develop a chronic interictal psychosis [4–7, 13, 20, 21]. For example, in a study of 18 patients with PIP and 18 controls, 7 patients (39%) with PIP went on to develop interictal psychosis, whereas only one control patient did so [7, 8]. In other studies, the development of interictal psychosis ranged between 13 and 39% [4, 5, 20, 21]. By the same token, patients with interictal psychosis may experience PIP. For example, in a study of 14 patients with both interictal and postictal psychotic episodes, 10 initially experienced PIP and went on to have interictal psychotic episodes, whereas 4 patients experienced an interictal psychotic episode that remitted and later had a postictal psychotic episode [22]. The importance of treating these episodes and preventing more episodes is clear.

5. Management and treatment of postictal psychosis

Postictal psychosis is a self-limiting condition and, in many cases, can be managed by observation and nursing or carer supervision. Lancman et al. [12] did not demonstrate any benefits from either neuroleptics or psychotherapy and noted that most patients returned
to their premorbid state within 1 week regardless of intervention. However, with any deterioration or florid psychosis, intervention is required. Logsdail and Toone [5] reported that more than half their patients needed to be treated with major tranquilizers and one with lithium. Some patients respond well to mild sedation (with benzodiazepines or choral hydrate) given in a supportive environment. There are no studies of comparative treatments, but benzodiazepines may be the first choice of therapy. If successful, they can be given to the patient or relative to be administered at the first hint of the development of any psychosis. They can also be used either to abort a cluster of seizures or, following a cluster, at the first warning of any developing psychopathology such as irritability, mood lability, and sleeplessness. It is important to avoid giving neuroleptic medications, which may provoke another seizure and, hence, a worsening of the psychosis. Kanner et al. [4] treated one patient with a previous history of PIP prophylactically with neuroleptics, prior to deep electrode recording, and no psychosis occurred despite a cluster of seizures. Atypical neuroleptics are preferred.

6. Postictal psychosis and epilepsy surgery

Psychosis is considered by some centers to be a factor excluding epilepsy surgery [23]. The first line of management of patients who only have episodes of psychosis following seizures should be attaining seizure control. When this is not possible and the patient is being considered for surgery, it is important to determine whether her or his chance of becoming seizure free is high. If this is shown, then the history of PIP is not a contraindication.

Few studies have addressed the outcome of surgery in patients with preoperative psychoses. Kanemoto et al. [24] reported postoperative mood disorders (depression, hypomania, and mania) in 8 of 38 cases. Risk factors for psychopathology were preoperative episodes of PIP, left-sided operations, and auras of ictal fear. As some of these affective disorders may be severe and associated with suicidality, the history of PIP should mean even more careful postsurgical monitoring of the psychiatric state.

7. Conclusions

Postictal psychosis is one of the most clearly defined of the neuropsychiatric syndromes, and yet it will not be found in such widely used diagnostic manuals as the DSM-IV or the ICD-10. It is characterized by a cluster of seizures, followed by a lucid interval, followed by the sudden eruption of a clinical disorder with a mixed affective picture, often accompanied by religious delusions and fear of impending death, lasting usually a matter of days.

The link to seizures arising from the medial temporal limbic structures is suggested by clinical features of the epilepsy and limited EEG and imaging data. A bias toward right-sided pathology is noted (in contrast to the bias toward left-sided pathology in interictal psychoses), but the psychosis itself would seem to be associated with bilateral disturbances of cerebral function, but without the characteristics of a postictal confusional state. In other words, patients are often well oriented or only minimally confused, and at least in some of the EEG studies, the EEG is, if anything, normal or only minimally revealing of spike or spike–wave activity. This raises an interesting issue and comparison with another psychotic state, linked to seizures, but in which seizures are suppressed, namely, forced normalization. That disorder can emerge quite suddenly, with florid delusions and a clear consciousness in which the EEG is normalized.

To date there is not enough neurophysiological information on postictal psychosis to elaborate on this, but it is worthy of much more study, which should reveal much about the effects of seizures on the brain and links with psychopathology. To what extent the abnormal mental state in postictal psychosis is associated with central nervous system local or more generalized inhibition secondary to physiological activity after a cluster of seizures is unknown, but the similarities are worth considering from the theoretical and clinical points of view.

Another interesting feature is the strong affective component of the psychopathology, posing questions of links with bipolar disorder and postictal mania and the regulation of affect by the brain. Indeed, postictal psychosis and forced normalization are perhaps the two most interesting syndromes in all of epileptology.

References