Seizures and benign myoclonus during sleep

Clinical description

The *generalized seizure* is the most frequent in the neonatal period; nonetheless, it is less common for the newborn than other ages, during which three phases occur successively:

1. Tonic phase (generalized rigidity)
2. Clonic phase (disorganized, jerky movements of the limbs, randomly migrating from one part of the body to another)
3. Resolutive phase, with relaxation of muscles and sphincters and more or less permanent alteration of alertness. The duration can vary, usually short for the first two phases, ranging from 30 seconds to several minutes in total. In the newborn, and even more the premature infant, the phases are more intricate.

Three elements have meaning in identifying a seizure:

1. The *repetitive and rhythmic* motor discharges.
2. *Cyanosis*, because the tonic phase is accompanied by apnea of variable duration.
3. The alteration in alertness succeeding this phase with more or less prolonged reactivity. Indeed, thanks to these two elements, it is firstly, possible to recognize short atypical seizures and secondly to ignore clonic reactions, which are very spectacular, but not seizures.

Focal or multifocal seizures are confined to a region of the body or to one side; however, they usually become generalized secondarily. They derive from a more localized cause than in the previous case. The location of the crisis does not allow us to determine with certainty the origin of the brain injury, and the issues associated with alertness are more discreet than in the previous case.

The *pure tonic seizure* is an invincible contraction throughout the body but it especially affects the antigravity muscles, briefly creating a hyperextension posture. It is usually the sign of a severe organic pathology.

Myoclonic seizure is difficult to recognize; clonic movements affect only flexor muscles (especially upper limbs) in a focal or multifocal manner. It is seen in some metabolic diseases but we must first eliminate physiological sleep myoclonus (see below).

Partial seizure is difficult to recognize, as it is limited to one muscle group. The more severe the child's condition is, the more intense the seizure is. This situation can be observed during the half-hour following a difficult resuscitation, when the child is still in the delivery room, completely unresponsive. It is the repetition and *rhythmic* aspect of the movement that catches the attention; around the eyelids, the labial commissure, the fingers (rhythmic closing of the hand), the diaphragm (rhythmic shaking at the epigastrium). In most severe hypoxic-ischemic encephalopathies, seizures have no further clinical manifestations and are only recorded on the electroencephalogram (EEG), and therefore called subclinical seizures.

Evolutive mode

Later on, we will see the therapeutic conducts used before confirmation by the EEG, but with or without treatment, there are several possibilities: either the crisis remains isolated, or seizures recur, in a subintrante manner, accompanied by lethargy than coma. If this condition lasts longer than 30 minutes, it is referred to as status epilepticus.

Emergency actions

The first biological investigations are as follows: glucose, calcium, acid-base balance, electrolyte balance, complete blood and cell count, lumbar puncture, samples for bacteriological and viral researches.

Immediate therapeutic procedures involve stopping the feeding, installing a perfusion for immediate intake of glucose and calcium, and maintaining this access to the vein; starting (except in obvious cases of hypoglycemia immediately corrected) anticonvulsant therapy with phenobarbital: a start-up dose of 20 mg / kg through slow intravenous injection quickly allows for a useful blood level of 20 to 40 mg / l. These doses can be increased if necessary. Start broad spectrum antibiotics intravenously until cancellation by the laboratory of an infectious cause. Other anticonvulsant drugs can be used. There is no consensus on the choice of anticonvulsant, however phenobarbital (Gardenal ®) is the most preferred as a first intention. It has little depressant effects on respiratory function and can be used until the baby needs ventilatory support. This is a general initial approach, which can be modified according to technical conditions and following etiological orientations.The key points are summarized as follows:

- trying to stop seizures even before getting an EEG as seizures themselves have adverse effects on cerebral circulation;
- not risking to delay treatment for meningitis, that is to say treat all children with antibiotics until proven otherwise. The EEG data, both standard and amplitude EEGs are an essential complement to clinical supervision; it will be discussed later.

Benign sleep myoclonus

It is important to be aware of benign sleep myoclonus as it can be mistaken for seizures. These myoclonic spasms occur during the first days of life and may extend over the first few weeks. Whether focal or generalized to four limbs, these clonus are rhythmic, and they lead to broad movements of limbs, every 1-3 sec over a span of 10 to 30 minutes. Their main characteristics are:

- *they are often sleep-related a*nd can be observed while the child is falling asleep and especially during calm sleep (non-REM). They cease immediately upon waking, whether spontaneous or induced;
- they occur in a child with normal neurological examination results;
- they occur without any EEG alterations. One must be aware of their existence as not to trigger various investigations and needless anxiety.