CASE REPORT

Why in the age of CT scans and MRIs is a brain tumour mistaken for a psychiatric illness?

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SUMMARY

The first author of this paper operated on two patients with brain tumour, who had been undergoing long-term treatment for depression. In the age of CT scans and MRIs, why are there still cases in which a brain neoplasia is mistaken for a psychiatric condition with consequent serious delays in diagnosis? In this article, we have highlighted what in our experience are three noticeable obstacles in achieving the right diagnosis.

BACKGROUND

In the recent past, the first author of this paper performed surgery on two very large benign brain tumours, which in both cases had grown to vast dimensions due to being originally misdiagnosed: the symptoms had been mistaken for those of depression. The patients in fact had been wrongly treated for years as suffering from psychiatric disorders.

This experience led us to wonder: what are the reasons why in the age of CT scans and MRIs there are still cases in which a brain neoplasia is mistaken for a psychiatric condition with consequent serious delays in diagnosis and treatment? How widespread is the phenomenon? This work attempts to answer those questions, while analysing these two particular cases.

CASES PRESENTATION

First patient

In February 2010, a 56-year-old woman with a very large left anterofrontal brain tumour was admitted to hospital. Three years before, the patient had abruptly started suffering from major endogenous depression and sudden fits of anger. She became lazy at work and neglected the housework. She also started to eat excessively, displaying episodes of uncontrolled bulimia that led her to gain 25 kg over time. She was referred to a psychiatrist and, on assessment, she scored 40 (normal value <28) on the Brief Psychiatric Rating Scale (BPRS). The specialist prescribed 20 mg of paroxetine, but the therapy did not yield improvements. In the year prior to admission, the patient also began to suffer from memory loss and impaired ambulation. Eventually, because of her difficulty in walking, the consultant doctor decided to prescribe a brain MRI that showed there was a tumour (figure 1).

In hospital, Romberg's test showed that the patient could not keep her balance with her eyes shut; she also presented a slight loss of strength

in both her right limbs. During the interview, she appeared detached and uninterested even in her own situation; she also seemed shabby in her appearance and dismissive of herself. The first author of this paper operated on the patient with success; the tumour was wholly removed. The histological examination confirmed that the tumour was a meningioma. The postoperative course was normal. In the month following the operation, all the symptoms lamented and displayed by the patient disappeared completely. At present, the woman, who in the meantime has also lost weight, lives a normal life with her family and friends, and is once again productive at work.

Second patient

In June 2010, a 35-year-old woman was admitted to hospital. The patient had had a brain MRI, which showed that a very large tumour had grown into most of the fourth ventricle and had also spread out into the spinal canal to C2. The obstruction of cerebrospinal fluid (CSF) flow caused by the tumour had resulted in a hydrocephalus.

The patient had begun showing symptoms 3 years before, when, soon after the birth of her first daughter, she felt so fatigued as to be unable to lead a normal active life. She was diagnosed with postpartum depression and was prescribed a 25 mg tablet of agomelatine per day. The therapy proved unsuccessful. A psychiatrist assessed her using the BPRS and this patient too scored 40. A year and a half after childbirth, and immediately after a miscarriage, the woman started to complain of frequent neck pain, episodes of sudden electric shock sensation along her spine and nausea often resulting in vomiting. All these symptoms were interpreted as episodes of severe anxiety, combined with mood disorders. Benzodiazepine was added to the antidepressants therapy the patient was already on. In the 6 months prior to the operation, the patient began to suffer from gradually worsening pressure headaches. It was this last symptom that made the consultant doctor prescribe an MRI scan of the head (figure 2).

On examination, the patient showed bilateral papilledema, wide-base stance and gait and tetra-hyperreflexia. The tumour was surgically removed in toto. The histological examination revealed an ependymoma. The postoperative course was complicated by the occurrence of a CSF fistula and leakage of CSF from the surgical wound. For the complete healing of the fistula, the patient had to stay an extra 7 weeks in hospital after surgery.

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Figure 1 MRI shows a very large round left frontal tumour. It is surrounded by cerebral oedema and arises on the dura mater.

The patient is now in excellent clinical and neurological condition and she has given birth to a second baby.

OUTCOME AND FOLLOW-UP

In the months after surgery, the removal of both tumours led to the complete disappearance of all the symptoms that had been wrongly diagnosed as signs of depression. The two patients have undergone postoperative check-ups and regular MRI scans, the last in 2016. There has been no recurrence of the tumour in either case. In April 2017, we have asked both patients to undergo psychiatric evaluation; they have been once again assessed according to the BPRS, neither patient presented any sign of depression and the scores are, respectively, 24 and 25.

DISCUSSION

When discussing the relationship between psychiatric disorders and cerebral neoplasias, it is necessary to make an important distinction between two similar and yet different types of patients:

1. There are people suffering from psychiatric conditions, whether mild or severe, who, at some point in their lives, independently from their psychiatric disorders, develop a brain neoplasia. When imaging reveals unrelated brain tumours, it is always important to consider the potential psychological and psychiatric consequences of surgery if there is a possibility that a benign slow-growing tumour may not yield neurological impairments during the lifetime of the patient.

Figure 2 MRI shows a very big tumour in the fourth ventricle and in the spinal canal to C2. There is also a hydrocephalus.

2. There are people who affected by a brain tumour suddenly develop psychiatric disorders as a first symptom of the tumour.

Sometimes, it is hard to tell the two types of patient apart, especially in the case of slow-growing benign tumours, like the ones we have here presented. The unsuccessful psychiatric drug treatment and the complete disappearance of the psychiatric symptoms after surgery, in our view, firmly places these two cases in the second group.

It has been known since the last century that intracranial tumours cause^{1–3} with a frequency as high as 50%–78%^{4–5} psychiatric disorders such as anxiety, personality changes, mania, psychosis, cognitive deterioration, anorexia, bulimia, non-affective behaviour and depression.

Mental disorders can be sometimes symptoms of the onset of a tumour and for a long time they can be the only symptoms present.⁶ This is the reason why the literature suggests to carry out a brain MRI or a CT scan on all patients displaying ‘a first psychotic break or personality change after the age of 50 years’.^{7,8} How often is this advice followed? Unfortunately, after an extensive search in Scopus and ISI WEB of all the articles that since 2000 have treated the subject of mental disorders associated with brain tumours, we have not found enough data to provide reliable statistics. A series of evaluations led me to think that brain-imaging examinations are seldom carried out on patients with mental disorders. Let us take into account depression: it was present in the two cases treated in this article. This psychiatric disorder is rather common according to the European Study of the Epidemiology of Mental Disorders⁹; in Italy, for example, 11.2% of people suffer from major depression or dysthymia during their lifetime, whereas every year only 0.01% of the population falls ill with a primary brain tumour.¹⁰ The huge disproportion in the incidence of the two diseases is such that when faced by a patient suffering from depression, general practitioners (GPs) and psychiatrists very seldom think that the aetiology of the disease could be a cerebral neoplasia. It is necessary to also point out that, from a psychiatrist’s perspective, there are numerous difficulties in the investigation of physical symptoms related to mood disorders; a patient with depression showing significant somatic symptoms is usually reluctant to undergo further diagnostic testing. Scans are seen as a source of anxiety to avoid. It is therefore not easy to convince people suffering from psychiatric disorders to go for a consultation with another specialist and undergo scans.

If we also consider that in many countries the growing public health expenditure has led over the years to a policy of determent of imaging prescription by doctors, we do understand very well why and how often the above-mentioned recommended guideline is disregarded. As far as Western countries are concerned, we have not found in the literature data about the average length of time between the onset of the first symptoms of a brain tumour and the formulation of a proper diagnosis. So, though it is not possible for us to scientifically prove that there is often a delay in diagnosing cases of cerebral tumours when the first symptoms are psychiatric disorders, by reading numerous case reports from 2000 to the present,^{4–11–20} we have reason to suspect that this phenomenon is not uncommon and that, especially in the case of slow-growing benign tumours, we only reach the right diagnosis when the tumours have reached large or even enormous dimensions.

Neither of the patients underwent neurological examinations prior to the brain MRIs nor did they undergo any cognitive tests. This leads us to highlight the paramount importance of running a careful physical examination on most people visiting a GP, which is often very hard given the time constraints.

In hindsight, the repeated failure of the antidepressant therapy and the onset of physical symptoms, however small, were important clues and should have alerted practitioners to the presence of an organic brain syndrome.

Learning points

Although the review of the literature has not allowed us to give definitive answers to the questions posed by our experience, we think that it is not inappropriate to draw some conclusions.

- The first one is that it is absolutely necessary to start multicentre and multifactorial studies, both retrospective and perspective, that can indicate how long it usually takes to reach a diagnosis of cerebral tumour from the onset of the first symptoms, especially gathering data on misdiagnoses and their rate of occurrence. These studies would allow us to better understand what kind of obstacles our health systems routinely face and what clinical or other factors can lead to delays in diagnosis.
- The second conclusion concerns the type of diagnostic attitude to keep when in front of the sudden onset of one or more psychiatric symptoms in an adult. We think that together with a psychiatric assessment, it would be beneficial to carry out a careful neurological examination to search for any signs (even small signs) of central nervous system disorders. If neurological tests yielded no results, while psychiatric symptoms failed to respond to drug treatment, the neurological examination could be repeated over time because a sign that was not present at first may appear later on.
- If in doubt, or if the neurological examinations showed any abnormality, a brain MRI (or alternatively a CT scan) should be performed to search not only for a tumour but also for any vascular disorders or any disorder of CSF circulation that might cause the condition. If imaging examinations cannot be performed for economic reasons, it should be advisable to carry them out if the psychiatric symptoms appear to be resistant to medical therapy or if there are any signs of neurological impairment.
- When patients with psychiatric problems begin to also show organic disorders, it is absolutely imperative for the psychiatrist, GP and other specialists, such as neurologists and brain surgeons, to closely collaborate in order to provide the best and quickest diagnosis and treatment.

Contributors RC is the main author of the article; on the basis of the observations made by reviewers, RC felt it was necessary to add the viewpoint of a psychiatrist (AP).

Competing interests None declared.

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