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Impact of maternal brain tumours on perinatal and maternal management and outcome: a single referral centre retrospective study

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ABSTRACT

Objective: To evaluate the impact of maternal brain tumours on perinatal and maternal management and outcome.

Study design: We performed a retrospective cohort study in a single referral centre with departments of obstetrics, neurology, and neurosurgery from January 2003 to July 2011. Cases were retrieved from our hospital databases, excluding pituitary adenomas, metastasis, and vascular tumours. Postnatal follow-up was of at least 6 months. Studied parameters were tumour type, gestational age at diagnosis if applicable, neurological events, obstetrical complications, pregnancy outcome, mode of delivery, peripartum analgesia, need for specific treatments, and maternal morbidity and mortality.

Results: 20 women (23 pregnancies) diagnosed with a brain tumour. Overall, there were 4 terminations of pregnancy, 4 elective premature caesarean deliveries, 15 live births ≥37 WG (9 caesarean and 6 vaginal deliveries), and 4 maternal deaths within 6 months postpartum. The brain tumour was diagnosed during pregnancy in 7 cases (group A), before pregnancy with preconception counselling in 10 (group B), and before pregnancy without preconception counselling in 6 (group C). In group A, there were 1 termination of pregnancy (TOP), 3 preterm elective caesarean deliveries, 3 live births ≥37 WG with one vaginal delivery, and 2 maternal deaths. In group B, there were 1 elective premature caesarean delivery and 7 live births ≥37 WG with 4 vaginal deliveries. In group C, there were 3 TOP, 3 live births ≥37 WG with one vaginal delivery, and 2 maternal deaths.

Conclusions: Poor perinatal outcome and maternal death were associated with unplanned pregnancies and tumours diagnosed during pregnancy. Vaginal birth with epidural analgesia was nevertheless observed in all groups.

Introduction

Management of a central nervous system (CNS) tumour during pregnancy often presents complex challenges. Population based studies showed that brain tumours are associated with an increased risk of maternal mortality, premature delivery, intra uterine growth restriction (IUGR), and caesarean delivery [1].

Pregnancy is known to speed-up the growth of meningioma whereas exposure to estrogens might decrease the incidence of gliomas [2–8]. Moreover, the literature is very poor in data helping professionals counsel patients and take decisions concerning the mode of delivery and type of analgesia.

In order to improve understanding of obstetrical risks in these patients and to assist with treatment, counselling, and monitoring during delivery, we performed a retrospective study of pregnancies associated with brain tumours managed over a 9-year period in a single centre.

Materials and methods

We searched the database of the department of obstetrics and gynaecology using "brain tumour", and "neurosurgery", as key words between January 2003 and July 2011. We excluded pituitary adenomas and vascular tumours. Cases were included regardless of pregnancy or maternal outcome. Obstetrical, neurological, and neurosurgical files were reviewed for the studied parameters.

We stratified our series according to when the tumour was diagnosed, and to whether the women had preconception counselling. This resulted in 3 subgroups: tumour diagnosed during pregnancy (group A), tumour diagnosed before pregnancy

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with preconception counselling by a neurologist or neurosurgeon and an obstetrician (group B), and tumour diagnosed before pregnancy without preconception counselling (group C).

The following parameters were recorded: tumour type, size, location, gestational age at diagnosis if applicable, treatment before pregnancy neurological events during pregnancy (seizures, intracranial hypertension, neurosurgery), obstetrical complications (premature delivery or IUGR), pregnancy outcome, mode of delivery and analgesia, the need for specific treatments, maternal morbidity and mortality with a postpartum follow up of at least 6 months.

Results

Over the study period, a total of 23 pregnancies were identified, with a wide spectrum of tumour types (Table 1). Median maternal age at the onset of pregnancy was 33.5 years (26–42).

The diagnosis of brain tumour was made during pregnancy in 7 women (group A), one in the first, two in the second, and four in the third trimester. Symptoms leading to diagnosis during pregnancy were balance disorder, blurred vision and hearing disorder (patient n°3), diplopia (patient n°5, 7 and 21), headache (patient n°7, 10 and 21), epilepsy (patient n° 15 and 18), and facial paralysis (patient n° 18).

Brain tumour had been diagnosed prior to pregnancy in 16 women (70%). Ten of them had had preconception counselling (group B), and 6 had not (group C).

Overall, there were 4 terminations of pregnancy (TOP) and 19 live births.

The four TOP were motivated by a need for treatment early in pregnancy. Two of these patients died during the follow-up period despite aggressive treatments. One of the other two patients, case n°19, was treated by surgery and radiotherapy and had another pregnancy (case n°20) a year later after preconception counselling with a favourable outcome.

Table 1
Medical history and pregnancy course in women with brain tumour or history of brain tumour.

Pregnancy n°	Group	WG at diagnosis for group A	Maternal age	Tumour type	Benign/ malignant	Neurological treatment before pregnancy	Treatment at conception	Treatment during pregnancy
3	A	25WG	33	Oligodendroglioma grade III	Malignant	0	0	Ventricular derivation antiepileptic drugs[a] and corticosteroids
5	A	39WG	35	Meningioma	Benign	0	0	Corticosteroids
7	A	32WG	36	Cerebellopontine angle chondroma	Malignant	0	0	Corticosteroids
10	A	At onset of pregnancy but symptomatic at 32WG	30	Neurocytoma	Malignant	0	0	0
15	A	37WG	26	Arachnoid cyst	Benign	0	0	Antiepileptic drugs[b]
18	A	14WG	38	Glioblastoma	Malignant	0	Antiepileptic drugs[c]	Antiepileptic drugs[b+d] and corticosteroids
21	A	29WG	27	Meningioma	Benign	0	0	Antiepileptic drugs[b] and corticosteroids
1	B		35	Arachnoid cyst	Benign	0	Antiepileptic drugs[e]	Antiepileptic drugs[e]
22	B		37	Arachnoid cyst	Benign	0	Antiepileptic drugs[e]	Antiepileptic drugs[e]
4	B		37	Oligodendroglioma grade II	Malignant	Chemotherapy (Temozolomide)	0	0
11	B		29	Astrocytoma	Malignant	Surgery and ventricular derivation	0	Ventricular derivation
13	B		42	Astrocytoma	Malignant	Surgery	Antiepileptic drugs[f]	Antiepileptic drugs[f]
14	B		35	Oligo astrocytoma grade II	Malignant	Surgery	Antiepileptic drugs[g+d]	Antiepileptic drugs[g+d]
16	B		34	Neurocytoma	Malignant	Surgery	0	0
23	B		36	Neurocytoma	Malignant	Surgery	0	0
17	B		28	Astrocytoma	Malignant	Surgery	0	0
20	B		32	Neuroepithelial dysembryoplastic tumour	Benign	Radiotherapy	Antiepileptic drugs[f]	Antiepileptic drugs[f]
2	C		30	Pinealoblastoma	Malignant	Ventricular derivation	0	Surgery, radiotherapy, antiepileptic[h] drugs, and corticosteroids
6	C		33	Glioma	Malignant	Surgery, chemotherapy and radiotherapy	0	0
8	C		32	Glioblastoma	Malignant	Surgery, chemotherapy and radiotherapy	0	0
9	C		34	Craniopharyngioma	Benign	0	0	0
12	C		41	Glioma grade II	Malignant	Chemotherapy and radiotherapy	Chemotherapy (Temozolomide)	Chemotherapy (Temozolomide)
19	C		31	Neuroepithelial dysembryoplastic tumour	Benign	0	0	0

Pregnancies number 1 and 22, 16 and 23, and 19 and 20 occurred in the same 3 patients within the study period.
[a] Clonazepam.
[b] Levetiracetam.
[c] Oxcarbazepine.
[d] Clobazam.
[e] Carbamazepine.
[f] Valproic acid.
[g] Lamotrigine.
[h] Phenobarbital.