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Solitary cystic cerebral metastasis from transitional cell carcinoma of the bladder

Andreas ZIGOURIS[1], Dimitrios PAHATOURIDIS[1], Evaggelos MIHOS[1], George A. ALEXIOU[1], John NESSERIS[2], Anastasia K. ZIKOU[3], Maria I. ARGYROPOULOU[3], Anna GOUSSIA[2] and Spyridon VOULGARIS[1]

[1]Department of Neurosurgery, [2]Department of Pathology, [3]Department of Radiology, University Hospital of Ioannina, Greece

Abstract

Metastatic brain tumors are the most common intracranial neoplasm in adults. Bladder cancer gives metastasis to the brain in less than 1%. Herewith, we report on a case of a 71-year-old man who was admitted to the emergency department after an episode of loss of consciousness. On neurological examination a left hemiparesis was observed. The patient's previous history entailed a total cystectomy and radical prostatectomy 7 months ago because of a transitional cell carcinoma (TCC) of the urinary bladder. Brain imaging work-up revealed a cystic lesion with perifocal edema in the right frontal lobe. The patient was operated and the histological diagnosis was consistent with a metastatic carcinoma, with morphological, histochemical and immunohistochemical features comparable to those of the primary tumor. Postoperative the patient was in excellent neurological state and received complementary chemotherapy and total brain irradiation. Additional imaging and laboratory examinations excluded other metastatic lesion. The patient died 18 months later due to systemic disease. Although intracranial metastases from TCC of urinary bladder have a low incidence, in follow-up examinations any alterations in neurological status in these patients should be thoroughly evaluated.

Key words: Bladder cancer; brain metastasis; transitional cell carcinoma.

Introduction

Metastatic brain tumors are the most common intracranial neoplasm in adults. The majority of brain metastases originate from lung cancer (40%-50%), breast cancer (15%-25%), and melanoma (5%-20%) (Polyzoidis *et al*., 2005). Cerebral metastasis from urinary bladder carcinoma is exceedingly rare and accounts for 0,3 to 1,8% of all brain metastasis (Davis *et al.*, 1986; Anderson *et al*., 1992; Vinchon *et al*., 1994). Herewith, we report on a case of a solitary cystic cerebral metastasis from a transitional cell carcinoma (TCC) of the bladder occurring 7 months after resection.

Case report

A 71-year-old man admitted to the emergency department because of an episode of loss of consciousness. After taking a detailed history the episode was considered to be of epileptic origin. Neurological examination disclosed left hemiparesis. In the past clinical history there were a total cystectomy and radical prostatectomy 7 months ago because of a TCC of the urinary bladder. The patient also received chemotherapy and focal irradiation. In his current admission a brain CT was performed and revealed a lesion in the right frontal lobe. MRI that ensued showed a mainly cystic lesion with mass effect and perilesional edema in the right frontal lobe (Fig. 1A,B,C). Diffusion tensor imaging revealed increased diffusion in the cystic component excluding the presence of abscess (Fig. 1D). The patient was operated upon via a right frontal craniotomy and a solitary solid and partially cystic tumor was totally excised. The cystic portion of the tumor contained a green-grey fluid. The cytologic examination of the fluid revealed malignancy originating from urothelium. Tissue fragments of the brain mass, measured $1 \times 1 \times 0.3$ cm were examined histopathologically. Microscopically the presence of a malignant neoplasm invading the brain cortex was demonstrated (Fig. 2A). The neoplastic cells were arranged mainly in solid clusters and rarely in papillary structures with central fibrovascular cores (Fig. 2B). The cells were large in size, with abundant pale or clear cytoplasm and ovoid pleomorphic nuclei. Immunohistochemically the tumor cells were positive for

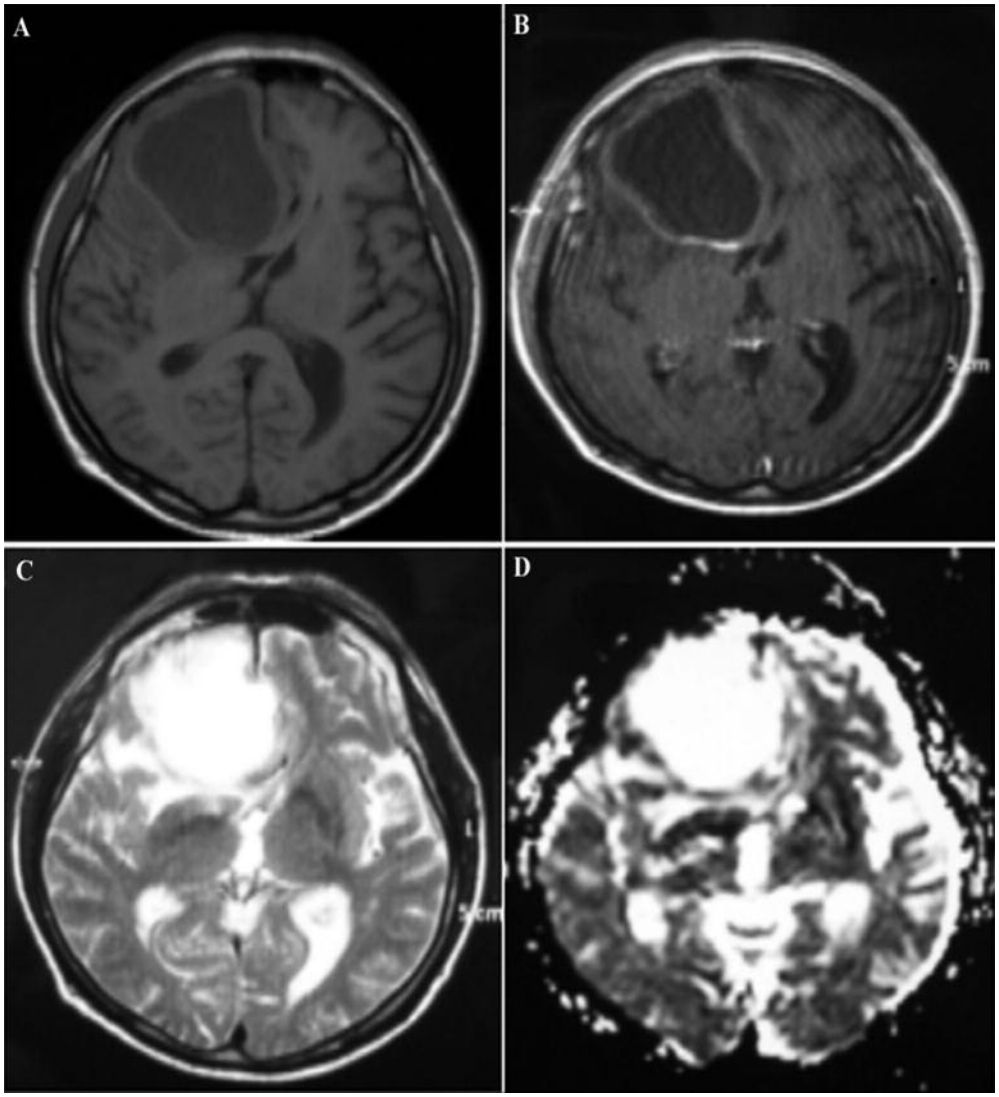

FIG. 1. — Brain MRI. A. Plain axial-T1 weighted scan shows a mass with low signal intensity surrounded by edema in the right frontal lobe. Midline shift is also observed. B. Contrast-enhanced axial-T1 weighted scan, shows rim enhancement. C. Axial T2-weighted scan. The mass appears with high signal intensity. D. Apparent diffusion coefficient (ADC) map, the lesion exhibits signal intensity similar to that of CSF, suggesting free diffusion.

pancytokeratin, keratin 7 and CD 10 antigen and negative for GFAP, keratin 20, vimentin, TTF1 and carcinoembryonic antigen (Fig. 2C,D). Histochemical stains showed the presence of glycogen in the cytoplasm of cells. The histological diagnosis was consistent with a metastatic carcinoma, with morphological, histochemical and immunohistochemical features comparable to those of the primary tumor. Postoperative the patient was in excellent neurological state and received complementary chemotherapy and brain irradiation. Additional imaging and laboratory examinations excluded other metastatic lesion. The patient died 18 months later due to systemic disease.

Discussion

TCC of the urinary bladder constitutes the majority of bladder carcinomas (88%) (Isaka *et al.*, 2002) and usually gives metastases to liver (38%), lungs (36%), bones (27%) and adrenal glands (13%) (Babaian *et al*., 1980; Maurizio *et al*., 1993). Solitary or multiple brain metastases are exceedingly rare (Rosenstein *et al*., 1993; Mahmoud-ahmed *et al*., 2002; Kenzi *et al*., 2008). Anderson *et al.* reported an incidence of 3,8% and in 7 out of 9 patients the lesion was solitary (Anderson *et al*., 1992).

In patients with known TCC brain metastasis should not be excluded. The time period in which

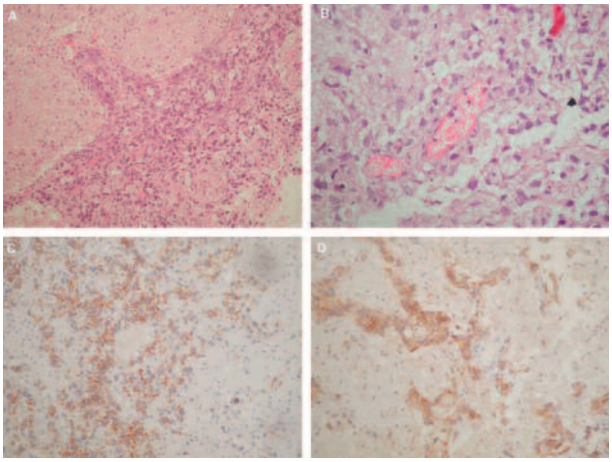

FIG. 2. — A. Malignant neoplasm invading the brain tissue. Note the sharp demarcation of tumor cells from the brain parenchyma (H/E ×200). B. Areas of the malignant neoplasm with rare papillary structures (H/E ×400). C. Immunohistochemical expression of keratin 7 in neoplastic cells (Avidin/Biotin Complex immunohistochemical method (ABC) ×100). D. Immunohistochemical expression of CD10 antigen in neoplastic cells (ABC ×100).

brain metastases have been detected ranges between 7 and 40 months after total cystectomy (Babaian *et al.*, 1980; Dhote *et al.*, 1998). Signs and symptoms depend on the lesion's localization and usually there are elsewhere metastatic lesions as well (Qasho *et al.*, 1999; Davies *et al.*, 2003).

With the introduction of methotrexate, vinblastine, doxorubicin, and cis-platin for the treatment of TCC, an increased incidence of metastatic brain lesions have been reported. This has been attributed to the inability of the previous chemotherapeutic regimens to penetrate the blood-brain barrier (Clatterbuck *et al.*, 1998; Dhote *et al.*, 1998; Mahmoud-ahmed *et al.*, 2002). Sternberg *et al.* reported that 12-18% of patients that were operated for TCC and received methotrexate, vinplastin, doxorumbicin and cis-platin developed brain metastasis (Vinchon *et al.*, 1994). Campbell *et al.* reported an incidence of 7% (Campbell *et al.*, 1981). More recently, similar results were reported by Jankevicius *et al.* (Jankevicius *et al.*, 2004).

Surgical excision followed by radiotherapy has been considered the mainstay treatment for brain metastases (Mahmoud-ahmed *et al.*, 2002). However, the overall survival is very poor, being between 2 and 7 months (Bloch *et al.*, 1987; Mahmoud-ahmed *et al.*, 2002). The prognosis is especially poor in patients who are treated solely with radiotherapy and with multiple brain metastases (Anderson *et al.*, 1992; Dhote *et al.*, 1998; Protzel *et al.*, 2002). Nevertheless, Protzel et al. reported nearly complete response after radiotherapy combined with gemcitabine monotherapy in a patient with multiple brain metastases (Protzel *et al.*, 2002).

Conclusion

Intracranial metastases from TCC of urinary bladder are rare and any reported similar case is of great interest as a guide to better assess the outcome of these patients. The systemic chemotherapy although used as a first-line treatment after the surgical excision of TCC can provide an ideal space into the brain for metastatic tumor growth. This important finding from several published data should encourage a revision of the therapeutic protocols, in order to decrease the occurrence of brain metastases.

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George Alexiou, M.D.,
Aetideon 52,
Holargos, Attikis,
11561 Greece
E-mail: alexiougrg@yahoo.gr
Cc e-mail: me01929@cc.uoi.gr