ORIGINAL PAPER/*ARTYKUŁ ORYGINALNY*

Radiation-induced tumours of meninges. Report on eight cases and review of the literature

Popromienne guzy opon mózgowo-rdzeniowych. Opis ośmiu przypadków i przegląd piśmiennictwa

Przemysław Kunert[1], Ewa Matyja[2], Marek Prokopienko[1], Andrzej Marchel[1]

[1]Department of Neurosurgery, Medical University of Warsaw
[2]Department of Experimental and Clinical Neuropathology, Medical Research Centre, Polish Academy of Sciences, Warsaw

Neurologia i Neurochirurgia Polska 2012; 46, 6: 542-552
DOI: 10.5114/ninp.2012.32099

Abstract

Background and purpose: Despite their rarity, post-radiation meningeal tumours seem to be a growing problem due to the increasing application of radiation therapy. The aim of the study was to ascertain the specific features of these tumours.
Material and methods: Among 433 intracranial meningeal tumours treated from 2000 to 2008, eight cases (2%) have been presumed to be associated with high-dose therapeutic radiation for previous neoplasm of the head (7) or neck (1). On average, tumours were diagnosed 24 years after irradiation. All patients had a solitary meningeal tumour, but two of them also developed other neoplasms in the irradiated area.
Results: All tumours were microsurgically removed. The postoperative course was uncomplicated in two cases only. In the remaining 6 (75%), complications included liquorrhoea (2), brain oedema (1), venous thrombosis (1), bleeding into the tumour bed (1) and focal deficit due to manipulation (3). Most tumours (5) were WHO grade I meningiomas. These benign meningiomas exhibited some peculiar histological features, including focal increase of cellularity, focal enhancement of proliferation index, pleomorphism of nuclei, occasional mitotic figures and, in one case, evidence of brain invasion. One meningioma was assigned to WHO grade II, one to WHO grade III and one appeared to be meningeal fibrosarcoma. The event-free survival and overall survival rate at 4.4 years of follow-up were 63% and 75%, respectively.

Streszczenie

Wstęp i cel pracy: Popromienne guzy opon mózgowo-rdzeniowych – mimo że stwierdzane rzadko – wydają się narastającym problemem ze względu na szerokie zastosowanie radioterapii. Celem pracy jest charakterystyka kliniczna i histopatologiczna tych guzów.
Materiał i metody: Spośród 433 śródczaszkowych guzów oponowych operowanych w latach 2000–2008, w 8 przypadkach (2%) stwierdzono związek pomiędzy powstaniem guza a przebytą radioterapią z powodu nowotworów głowy (7) i szyi (1). Guzy popromienne były rozpoznawane średnio po 24 latach od napromieniania. U wszystkich pacjentów wystąpiły pojedyncze guzy opon, ale u 2 dodatkowo pojawiły się inne nowotwory w obszarze napromienianym.
Wyniki: Wszystkie guzy były leczone mikrochirurgicznie. Przebieg pooperacyjny bez powikłań obserwowano tylko u 2 pacjentów. U pozostałych 6 (75%) komplikacje pooperacyjne obejmowały: płynotok (2), obrzęk mózgu (1), zakrzepicę żylną mózgu (1), krwawienie do loży pooperacyjnej (1) oraz ogniskowe deficyty neurologiczne wskutek manipulacji (3). W większości przypadków (5) stwierdzono oponiaki o niskim stopniu złośliwości histologicznej (I stopień wg WHO), które jednak wykazywały szczególne cechy histopatologiczne: ogniskowy wzrost zagęszczenia komórkowego i podwyższony indeks proliferacyjny, pleomorfizm jąder komórkowych, pojedyncze figury podziałów mitotycznych oraz, w jednym

Correspondence address: Przemysław Kunert, Katedra i Klinika Neurochirurgii, Warszawski Uniwersytet Medyczny, ul. Banacha 1A, 02-097 Warszawa, fax: +48 22 658 36 53, e-mail: pkunert@wp.pl
Received: 6.02.2012; accepted: 13.06.2012

Conclusions: Radiation-induced tumours of the meninges show certain characteristic histopathological features, which may promote invasiveness of the tumour and higher risk of malignancy.

Key words: radiation-induced tumour, meningioma, fibrosarcoma, radiotherapy.

przypadku, cechy naciekania mózgu. W jednym przypadku rozpoznano oponiaka II stopnia wg WHO, w jednym III stopnia wg WHO i w jednym włókniakomięsaka opon. Przeżycie wolne od zdarzeń i przeżycie całkowite w okresie obserwacji trwającym 4,4 roku wyniosły odpowiednio 63% i 75%.

Wnioski: Popromienne guzy opon mózgowo-rdzeniowych wykazują znamienne cechy histopatologiczne, które mogą sprzyjać większej inwazyjności i złośliwości tych guzów.

Słowa kluczowe: guz popromienny, oponiak, włókniakomięsak, radioterapia.

Introduction

Wilhelm Roentgen discovered X-rays in 1895 and shortly thereafter its usage in cancer patients was documented [1]. In the 20th century, rapid development of radiation treatment methods brought awareness of its side effects. Maria Skłodowska-Curie helped to introduce the use of radiation in medicine; nevertheless, she died almost certainly of radiation-induced leukaemia. The first experimental reports of the possible carcinogenic effects of ionising radiation appeared in the second decade of the 20th century, and the first radiation-induced sarcomas in humans were documented in the early 1920s [2].

Today, radiotherapy is commonly used. Moreover, exposure to X-rays is increasing due to progress in interventional radiology as well as the widespread use of computed tomography (CT). About 60 million CT examinations were performed in the United States in 2005, which is three times more than 10 years earlier. Theoretical calculations indicate that as many as 1.5-2% of neoplasms could be caused by radiation doses during CT examination [3].

Among brain tumours, which are believed to be caused by irradiation, the most frequent are meningiomas, gliomas and sarcomas [4]. Radiation-induced meningiomas (RIMs) have usually been reported as a later consequence of prior low- or high-dose radiotherapy. In the present study, we attempted to determine the distinct features of radiation-induced tumours of meninges with an emphasis on clinical and histopathological aspects. The study group consisted of seven RIMs and one fibrosarcoma arising from meninges. We decided to include the last case in the study because it represents the same clinical problem and aetiopathogenesis.

Material and methods

The personal files of 433 patients operated on for intracranial meningeal tumours between 2000 and 2008 have been retrospectively reviewed. Eight patients (2%) developed tumours that met the criteria of radiation-induced neoplasms. These tumours were qualified as post-radiation ones according to the adapted Cahan's criteria: the tumour had to arise at least several years after irradiation within the irradiated area and had to be histologically distinct from the previously treated tumour [2]. Among these 8 patients, there were 4 women and 4 men, aged between 28 and 67 (mean, 43). The patient's age at radiotherapy ranged from 2 to 31 years (mean, 19). The post-radiation tumours were diagnosed from 7 to 36 years after radiation treatment (mean, 24). Prior radiotherapy was applied to head (7) or neck neoplasms (1) including orbit rhabdomyosarcoma (2), hypophyseal adenoma (1), medulloblastoma (1), oligodendroglioma (1), anaplastic astrocytoma (1), unverified pineal region tumour (1), and thyroid neoplasm (1). The patient after thyroid gland irradiation had two tumours: foramen magnum meningioma and acoustic schwannoma. Cranial base location suggested a possible relationship between these tumours and previously administered radiation therapy.

In all cases, high-dose irradiation was used: X-ray radiotherapy in 3 and Co-60 radiotherapy in 5 patients. All the patients had solitary post-radiation meningeal tumours, but two of them had other coexisting neoplasms in the irradiated area (vestibular schwannoma – 1, basocellular carcinoma – 1; see Fig. 1F, H, I).

Each intraoperative difficulty and postoperative complication was analysed as possibly related to post-radiation changes. Early results were evaluated according to the Glasgow Outcome Scale (GOS) and the long-term

Download English Version:

https://daneshyari.com/en/article/2153065

Download Persian Version:

https://daneshyari.com/article/2153065

Daneshyari.com