Pleomorphic xanthoastrocytoma case series

2022

retrospectively analyzed a cohort of 16 adult and children patients with PXA who underwent primary resection from 1997 to 2019, referred to our Radiation Oncology Unit and to Meyer's Paediatric Hospital. We also reviewed the relevant literature.

All patients underwent primary surgical resection; 10 patients received adjuvant radiation treatment course, ranging from DTF 54 to 64 Gy; 8 of them received, in addition, concurrent adjuvant chemotherapy; 6 patients underwent only radiological follow-up. After a median follow up was 60 months: median OS was 34.9 months (95% CI 30-218), 1-year OS 87%, 5-years OS 50%, 10-years OS 50%; median PFS 24.4 months (95% CI 13-156), 1-year PFS 80%, 5-years PFS 33%, 10-years PFS 33%. A chi-square test showed a significant association between OS and recurrent disease ($p = 0.002$) and with chemotherapy adjuvant treatment ($p = 0.049$). A borderline statistical significant association was instead recognized with BRAF mutation ($p = 0.058$).

They did not reveal a strong prognostic or predictive factor able to address pleomorphic xanthoastrocytoma management; however, in selected patients could be considered the addition of adjuvant radiation chemotherapy treatment after adequate neurosurgical primary resection. Furthermore, recurrent disease evidenced a detrimental impact on survival [1)].

2016

Gaba et al retrospectively identified 39 patients who underwent surgery for intracranial PXA between 1994 and 2011. Demographic factors were recorded along with Karnofsky Performance Status (KPS), complications, and mortality.

Mean patient age was 31 years at the most recent surgery. A majority of patients (24; 62%) had multiple surgeries with a mean of 2 operations per patient. Eleven PXAs (28%) were malignant (grade III or IV). Perioperative complications included permanent neurological worsening in 4 patients (10%), regional complications in 4 (10%), and medical complications in 3 (8%). Preoperative KPS was ≥70 in 34 of 38 patients (89%). Long-term postoperative KPS was ≥70 in 36 of 37 patients (97%), suggesting good functional outcomes. There was no perioperative mortality, but 7 patients (18%) died of tumor progression. Patients with malignant PXAs trended toward higher risk of regional complications (3 of 11 patients [27%]; $P = .06$), received adjuvant therapy more often (10 of 11 patients [91%]; $P < .001$), had higher mortality from tumor progression (7 of 11 patients [64%]; $P < .001$), and were significantly larger (mean, 6.05 ± 0.73 cm standard error of the mean; $n = 7$; $P < .01$).

Both pediatric and adult PXAs may be resected with good functional outcomes. Perioperative neurological complications are relatively common, but do not affect long-term functional outcome or mortality. Malignant PXAs are higher risk for perioperative complications and, ultimately, death from tumor progression, despite increased use of adjuvant radiation and chemotherapy [2)].

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16 cases over 20 years of pediatric PXA treated with surgical resection alone with a 5-year relapse-

free survival of 40% (95% confidence interval, 20%-82%) and overall survival of 76% (95% confidence interval, 55%-100%). Gross total resection was associated with superior relapse-free survival (P<0.05). Some cases have a very long period between symptom onset or radiologic detection and resection, but neither length of symptoms nor radiologic signs of slow growth were associated with survival. PXA is a rare and unusual entity with unpredictable behavior. Complete surgical resection is optimal but does not guarantee relapse-free survival. We propose separation of PXA from other low-grade gliomas in childhood given differing biology and behavior. [3)].

2015

16 adult patients with reviewed PXA diagnosis. No IDH neither histone H3.3 mutations were found; BRAF V600E mutation was recorded in six patients. Ten patients presented with anaplastic features. BRAF mutations were associated with lower Ki67, OLIG2 expression, and lack of p16 expression. Median PFS and OS were 41.5 months (95% CI: 11.4-71.6) and 71.4 months (95% CI: 15.5-127.3), respectively. BRAF mutation tended to be associated with greater PFS (p = 0.051), whereas anaplastic features were associated with minimal PFS (p = 0.042).

PXA in adults PXA may present features distinct from pediatric PXA. Anaplastic features and BRAF mutation may potentially identify specific subgroups with distinct prognoses [4)].

2012

A total of 214 patients were identified with PXA using the November 2010 submission. Patient demographics, tumor characteristics, extent of surgical resection, the use of radiotherapy, and overall survival were evaluated. Overall survival for PXA was then compared to that of pilocytic astrocytoma, oligodendroglioma, ependymoma and glioblastoma also using the SEER database. Kaplan Meier analysis, univariate and multivariate analyses were performed. The majority of patients were found to be young adults with the most common tumor location being temporal lobe. Surgery was performed on most (95 %) patients, while 25 % of patients received radiation therapy. Five and 10 year overall survival rates were 75 and 67 %, respectively. Grade was only available for a limited number of patients but appeared to affect prognosis. Patients with grade IV tumors had a median overall survival of 45 months, whereas median survival was not reached for grade I-III patients. On multivariate analysis, male gender and increasing age were associated with worse overall survival (p values 0.05 and <0.006, respectively). Extent of resection trended towards significance in favor of gross total resection. PXA is a rare diagnosis that affects young adults. Surgical resection is the primary modality of treatment with an overall good prognosis. Elderly patients, those with higher grade disease and patients with incomplete resections may have a worse prognosis. The role of radiation therapy for PXA remains unclear but is more often used for patients with high grade tumors. Compared to other common brain tumors, PXA's appear to fare worse than pilocytic astrocytoma and oligodendroglioma, especially in younger patients. However, even high grade PXA patients have significantly better overall survival compared to glioblastoma [5)].

2007

Pleomorphic xanthoastrocytomas with malignant transformation have been reported in three out of

eight patients operated on for this type of tumor in the Neurosurgery Department, Regional Hospital of Treviso-Padova University, Italy. in the last 15 years. The three patients were two adult women and a child, the primary tumors were located in the cortex of the right temporal lobe, and treatment consisted of complete surgical resection. Histological examination revealed simple PXA in two patients and a PXA with anaplastic foci in the other. Mean recurrence time was 5.7 years, with the original xanthoastrocytoma evolving to glioblastoma in two cases and anaplastic astrocytoma in the third. All three patients underwent a second operation, followed by adjuvant therapies. Two died from tumor progression and one from brain edema after intracerebral haemorrhage. A review of the available PXA literature dating back to 1979 revealed 16 cases of primary anaplastic astrocytoma and 21 cases of PXA with malignant transformation. The experience adds three more cases of malignant transformations, outlining once again the potential malignancy of pleomorphic xanthoastrocytomas and the fact that prognosis in these cases is the same as for primary anaplastic astrocytoma and glioblastoma. Analysis of glioneuronal markers, Ki67 and p53 in all pleomorphic xanthoastrocytomas did not prove to be a discriminating factor to identify a subgroup of xanthoastrocytomas prone to malignancy. Accordingly, these tumors demand close long-term clinical and radiological follow-up. [6].

2001

Fouladi et al reviewed data on 13 children who had histologically confirmed PXA and were referred to the neuro-oncology service between 1985 and 1999. Neuro-imaging with CT and/or MRI documented the anatomic location, tumor extent, and degree of resection. There were 3 males and 10 females; median age was 12.9 years (range, 8.2-17.2 years). The most frequent presentations included seizures (n = 8) and headache (n = 5). Tumor sites included temporal (n = 5), parietal (n = 3), frontal (n = 1), frontoparietal (n = 1), parietooccipital (n = 1), and temporoparietal (n = 1) lobes and the spinal cord (n = 1). CT/MRI revealed a cystic component in 6 patients, with cyst wall enhancement in 3 patients. The solid component was uniformly enhancing in 11 patients. Vasogenic edema was present in 9 patients, and calcification was noted in 4 patients. Histopathologic findings included meningeal invasion in 12 patients, calcifications in 4, and necrosis in 2. Mitotic figures (1-12 per high-power field) were seen in 8 patients. Gross total resection was achieved in 8 patients, near total resection in 1, and subtotal resection in 4. Ten patients were alive with a median follow-up of 41 months at this writing. Two patients died of progressive disease, and 1 died of an unrelated cause. In conclusion, pleomorphic xanthoastrocytoma is a rare neoplasm in childhood, commonly presenting with seizures. Gross total resection without adjuvant therapy provides prolonged disease control, as seen in 6 of 7 patients (85%) in this series [7].

1999

71 cases with available information regarding clinical and therapeutic data and follow-up. Diagnostic features included cellular pleomorphism, giant and/or xanthic cells, eosinophilic granular bodies, desmoplasia, and leptomeningeal involvement. The mitotic index (MI), the presence of necrosis, and endothelial proliferation were recorded in all primary resection specimens.

The study included 35 females and 36 males, age 26+/-16 years (mean +/- standard deviation). Approximately 98% of tumors were supratentorial, with 49% in the temporal lobe. Seizures were the presenting symptoms in 71% of patients. Extent of tumor removal was macroscopic total resection in 68% of cases and subtotal resection (STR) in 32% of cases. Postoperative radiotherapy, alone or with chemotherapy, was administered in 29% and 12.5% of cases, respectively. The recurrence free survival rates (RFS) were 72% at 5 years and 61% at 10 years, whereas overall survivals rates (OS)

were 81% at 5 years and 70% at 10 years. In univariate analysis, the extent of resection was the single factor associated most strongly with RFS (P=0.003), followed by MI (P=0.007) and atypical mitoses (P=0.04). Necrosis was not found to be significant. The extent of resection and MI were confirmed as independent predictors of RFS by multivariate analysis. MI (P=0.001), atypical mitoses (P=0.02), and necrosis (P=0.04) were associated with OS by univariate analysis. In multivariate analysis, only MI was an independent predictor of survival. Information regarding MIB-1 labeling index and the use of adjuvant therapy was too limited to explore their prognostic significance confidently.

The study confirms that PXA is an astrocytic tumor with a relatively favorable prognosis. MI and extent of resection appear to be the main predictors of RFS and OS. Given the slow growth of the tumor, more studied cases and longer periods of follow-up will be essential to confirm our findings regarding prognostic factors affecting this unusual tumor [8].

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