Cystic craniopharyngioma treatment

Intracystic treatment options for cystic craniopharyngioma provide data suggestive of durable cyst shrinkage and benefit beyond a pure volume reduction due to repeated fluid aspirations. The effect however is limited to the cystic craniopharyngioma portion without an effect on the solid component. There are multiple challenges relating to technical practicalities: Multicystic occurrence may limit treatment to one cyst only and therefore this approach does not provide the clinical benefit as wished. The thickness of the cyst wall may not allow successful penetration of the scope/catheter into the cyst and different catheter designs make the correct intracystic positioning of the catheter and its holes difficult. Intraoperative ultrasound and computed tomography (CT) have aided to confirm the correct catheter position; however, volume changes during subsequent treatment may influence the intracystic catheter tip location.

Hence the prospect of a minimally invasive intervention – such as an endoscopic insertion of a catheter with a subcutaneous Ommaya reservoir – and subsequent instillation of substances inducing shrinkage of the craniopharyngioma cyst(s), seems a promising strategy [1)].

Intracystic bleomycin

A search in electronic databases CENTRAL (2014, Issue 1), MEDLINE/PubMed (from 1966 to March 2014) and EMBASE/Ovid (from 1980 to March 2014) with pre-specified terms, Reference lists of relevant articles and reviews, conference proceedings (International Society for Paediatric Oncology 2005-2013) and ongoing trial databases (Register of the National Institute of Health and International Standard Randomised Controlled Trial Number (ISRCTN) register) in May 2014.

Randomized controlled trials (RCTs), quasi-randomized trials or controlled clinical trials (CCTs) comparing intracystic bleomycin and other treatments for cystic craniopharyngiomas in children (from birth to 18 years).

Two review authors independently performed the data extraction and 'Risk of bias' assessment. They used risk ratio (RR) for binary data and mean difference (MD) for continuous data. We planned that if one of the treatment groups experienced no events and there was only one study available for the outcome, we would use the Fischer's exact test.

Zheng et al. could not identify any studies in which the only difference between the treatment groups was the use of intracystic bleomycin. They did identify a RCT comparing intracystic bleomycin with intracystic phosphorus 32 (n = 7 children). The trial had a high risk of bias. Survival could not be evaluated. There was no evidence of a significant difference between the treatment groups in cyst reduction (MD -0.15, 95% confidence interval (CI) -0.69 to 0.39, P value = 0.59), neurological status (Fisher's exact P value = 0.429), 3rd nerve paralysis (Fischer's exact P value = 1.00), fever (RR 2.92, 95% CI 0.73 to 11.70, P value = 0.13) or total adverse effects (RR 1.75, 95% CI 0.68 to 4.53, P value = 0.25). There was a significant difference in favour of the (32)P group for the occurrence of headache and vomiting (Fischer's exact P value = 0.029 for both outcomes).

Since they identified no RCTs, quasi-randomised trials or CCTs of the treatment of cystic craniopharyngiomas in children in which only the use of intracystic bleomycin differed between the treatment groups, no definitive conclusions could be made about the effects of intracystic bleomycin in these patients. Only one low-power RCT comparing intracystic bleomycin with intracystic (32)P

treatment was available, but no definitive conclusions can be made about the effectiveness of these agents in children with cystic craniopharyngiomas. Based on the currently available evidence, we are not able to give recommendations for the use of intracystic bleomycin in the treatment of cystic craniopharyngiomas in children. High-quality RCTs are needed [2)].

Phosphorus-32

Radioactive phosphorus 32 (P32) has been used as brachytherapy for craniopharyngiomas with the hope of providing local control of enlarging tumor cysts. Brachytherapy has commonly been used as an adjunct to the standard treatment of surgery and external beam radiation (EBR). Historically, multimodal treatment, including EBR, has shown tumor control rates as high as 70% at 10 years after treatment. However, EBR is associated with significant long-term risks, including visual deficits, endocrine dysfunction, and cognitive decline. Theoretically, brachytherapy may provide focused local radiation that controls or shrinks a symptomatic cyst without exposing the patient to the risks of EBR.

Ansari et al reviewed their experiences with craniopharyngioma patients treated with P32 brachytherapy as the primary treatment without EBR. The authors reviewed these patients' records to evaluate whether this strategy effectively controls tumor growth, thus avoiding the need for further surgery or EBR.

Ansari et al performed a retrospective review of pediatric patients treated for craniopharyngioma between 1997 and 2004. This was the time period during which the authors' institution had a relatively high use of P32 for treatment of cystic craniopharyngioma. All patients who had surgery and injection of P32 without EBR were identified. The patient records were analyzed for complications, cyst control, need for further surgery, and need for future EBR.

Thirty-eight patients were treated for craniopharyngioma during the study period. Nine patients (23.7%) were identified who had surgery (resection or biopsy) with P32 brachytherapy but without initial EBR. These 9 patients represented the study group. For 1 patient (11.1%), there was a complication with the brachytherapy procedure. Five patients (55.5%) required subsequent surgery. Seven patients (77.7%) required subsequent EBR for tumor growth. The mean time between the injection of P32 and subsequent treatment was 1.67 ± 1.50 years (mean ± SD).

In this small but focused population, P32 treatment provided limited local control for cyst growth. Brachytherapy alone did not reliably avert the need for subsequent surgery or EBR [3)].

interferon-alfa

interferon-alfa for Craniopharyngioma

Case series

11 non-consecutive adult cystic craniopharyngiomas (7 recurrent lesions) have been treated with Ommaya Reservoir System (ORS), in two neurosurgical centers. ORS was placed in nine cases using minimally invasive procedures: six burr hole endoscopic insertion and three navigated

electromagnetic placement; in the remaining two patients, the Ommaya reservoir was used as a shunt to prevent cyst recollection during a transcranial approach.

The main presenting symptoms were visual impairment (75%), cognitive and behavioral disorders (66.7%), hypopituitarism (38%), headache (30.8%) and hypothalamic obesity (8%). The median follow-up period was 41.4 months. In all patients, the visual function and intracranial hypertension improved after decompression. Local tumor control was accomplished in eight patients (72.7%), without the need of adjuvant treatments. The endoscopic vision carried similar rates of tumor control than the stereotaxy (75% vs 66.7%).

In selected patients, tailored procedures are required to achieve long-term tumor control and as well limit surgery-related morbidity. ORS could represent a safe and effective treatment option for cystic craniopharyngiomas, providing also reduced surgical related morbidity especially in recurrent lesions and in patients nonsuitable for radical surgery [4].

References

1)
Bartels U, Laperriere N, Bouffet E, Drake J. Intracystic therapies for cystic craniopharyngioma in childhood. Front Endocrinol (Lausanne). 2012 Mar 27;3:39. doi: 10.3389/fendo.2012.00039. eCollection 2012. PubMed PMID: 22654864; PubMed Central PMCID: PMC3356106.

2)
Zheng J, Fang Y, Cai BW, Zhang H, Liu W, Wu B, Xu JG, You C. Intracystic bleomycin for cystic craniopharyngiomas in children. Cochrane Database Syst Rev. 2014 Sep 19;9:CD008890. doi: 10.1002/14651858.CD008890.pub3. Review. PubMed PMID: 25233847.

3)
Ansari SF, Moore RJ, Boaz JC, Fulkerson DH. Efficacy of phosphorus-32 brachytherapy without external-beam radiation for long-term tumor control in patients with craniopharyngioma. J Neurosurg Pediatr. 2016 Apr;17(4):439-45. doi: 10.3171/2015.8.PEDS15317. Epub 2015 Dec 18. PubMed PMID: 26684761.

4)
Frio F, Solari D, Cavallo LM, Cappabianca P, Raverot G, Jouanneau E. OMMAYA RESERVOIR SYSTEM FOR THE TREATMENT OF CYSTIC CRANIOPHARYNGIOMAS: SURGICAL RESULTS IN A SERIES OF 11 ADULT PATIENTS AND REVIEW OF THE LITERATURE. World Neurosurg. 2019 Aug 7. pii: S1878-8750(19)32133-3. doi: 10.1016/j.wneu.2019.07.217. [Epub ahead of print] PubMed PMID: 31400528.