# Pregnancies after childhood craniopharyngioma – Results of KRANIOPHARYNGEOM 2000/2007

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## Introduction

Female CP patients with hypopituitarism frequently suffer from amenorrhea and infertility. Hypopituitarism is associated with pregnancy complications, such as abortion, anemia, pregnancy-induced hypertension, placental abruption, premature birth, postpartum hemorrhage, transverse line and small-for-gestational-age (SGA) newborns. Pregnancies in childhood-onset CP patients are uncommon and rarely reported in the literature.

## Study design

Observational study on pregnancy rate and offspring outcome in female CP patients recruited in KRANIOPHARYNGEOM 2000/2007 since 2000.

## Patient cohorts

This observational study included 451 patients (223 female/228 male) diagnosed with childhood-onset, adamantinomatous CP who were recruited in the multinational trials KRANIOPHARYNGEOM 2000/2007 since the year 2000. One hundred and thirty three of 223 female CP patients were postpubertal at the time of study. We contacted all 133 female postpubertal patients recruited in KRANIOPHARYNGEOM 2000/2007 and asked by questionnaire and/or telephone interview about previous pregnancies including abortions. The pregnancy rate, ovulation induction and obstetric and neonatal outcomes were investigated in this study.

## Results

Six of 133 female CP patients (4.5%) with a median age of 14.9 years at CP diagnosis had 9 pregnancies, giving birth to 10 newborns. Three patients achieved complete surgical resections. No patient underwent postoperative irradiation.

**Table 1: Characteristics of female patients. Data are depicted for the course of pregnancy and the deliveries.**

| Case No. | Age at pregnancy (years) | Pregestational endocrine substitution | G/P/A | BMI at pregnancy (kg/m²) | Pregnancy type | Ovulation induction | | | Endocrine substitution during pregnancy | Pregnancy complications | MOD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Age of 1st attempt (years) | Induction regimen | No. of cycle | | | |
| **1** | 22 | None | 1 / 0 / 0 | 26.50 | NP | None | None | None | None | None | ND |
| **2** | 39 | HC, L-T4, D | 1 / 0 / 0 | 23.28 | OI | 38 | HCG | 6 | HC, L-T4, D | None | ND |
| | 41 | HC, L-T4, D | 2 / 1 / 0 | 23.31 | OI | | HCG | 3 | HC, L-T4, D | None | ND |
| **3** | 38 | Insulin, HC L-T4, D | 1 / 0 / 0 | 41.40 | OI | 37 | HMG | 4 | Insulin, HC L-T4, D | Maternal hypoglycemia | CS |
| **4** | 30 | None | 1 / 0 / 0 | 21.97 | NP | None | None | None | None | **Cystic progression** | CS |
| | 36 | None | 2 / 1 / 0 | 25.31 | NP | None | None | None | None | None | CS |
| **5** | 28 | HC, L-T4, D,sex steroids | 1 / 0 / 0 | 32.80 | OI | 25 | HCG | 5 | HC, L-T4, D | Twin with preterm labour | CS |
| **6** | 27 | None | 1 / 0 / 0 | n.a. | NP | None | None | None | None | Bleeding in early pregnancy | ND |
| | 29 | None | 2 / 1 / 0 | n.a. | NP | None | None | None | None | **Cystic progression** | CS |

Abbreviations: A, abortus; BMI, body mass index; CS, caesarean section; D, desmopressin; G, Gravida; HCG, human chorionic gonadotrophin; HMG, human menopausal gonadotrophin; HC, hydrocortisone; L-T4, L-thyroxine; MOD, mode of delivery; NP, natural pregnancy; ND, normal delivery; n.a., not available; OI, ovulation induction; P, para

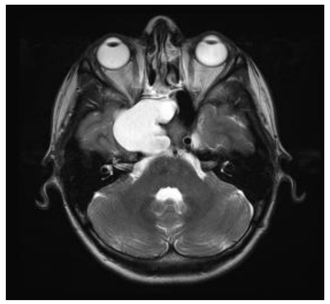

**Figure 1A**
T2 axial MRI of the cystic CP progression occuring during pregnancy in case 4

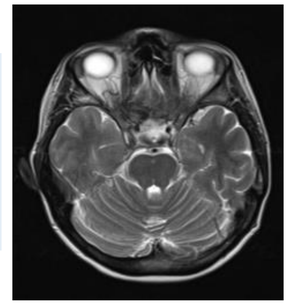

**Figure 1B**
T2 axial MRI after resection of cystic CP during pregnancy in case 4

**Table 2: Characteristics on pregnancy, delivery and offspring of craniopharyngioma patients.**

| Case No. | GA (weeks) | Gender | Apgar score | Birth weight (centile) | Birth length (centile) | Fetal abnormality | Breast feeding (months) |
|---|---|---|---|---|---|---|---|
| **1** | 38 | M | 10 / 10 | 2,880 g (P25) | 51 cm (P75) | None | 9 |
| **2** | 38 | F | 10 / 10 | 2,660 g (P9–25) | 51 cm (P91) | None | 12 |
| | $38^{+6}$ | F | 10 / 10 | 2,960 g (P25) | 51 cm (P75–91) | None | 8 |
| **3** | $37^{+2}$ | F | n.a. | 3,520 g (P91) | 51 (P91) | None | None |
| **4** | 40 | M | 9 / 10 | ~3,000 g (P9–25) | ~51 cm (P50) | None | 12 |
| | 41 | F | 10 / 10 | ~3,000 g (P9) | ~51 cm (P50) | None | 7 |
| **5** | 34 | F | 10 / 10 | 2,270 g (P50) | 44 cm (P50) | Choroid plexus cyst | None |
| | | M | 10 / 10 | 2,350 g (P50) | 45 cm (P75) | None | None |
| **6** | 43 | M | 10 / 10 | 3,800 g (P25–50) | 51 cm (P50) | None | None |
| | 36 | F | 10 / 10 | 2800 g (P50–75) | 48 cm (P75) | None | None |

Median gestational age at delivery was 38 weeks (range: 34–43 weeks); median birth weight was 2,920 grams (range: 2,270–3,520 grams), the rate of preterm delivery was 33%. Enlargements of CP cysts occurred in 2 women during pregnancy. Other complications during pregnancy, delivery and postnatal period were not observe.

## Conclusions

Pregnancies after CP are rare and were achieved in patients with hypopituitarism only after ART. Close monitoring by an experienced reproductive physician is necessary. Due to a potentially increased risk for cystic enlargement, clinical, ophthalmological and MRI monitoring are recommended in patients at risk. Severe perinatal complications, birth defects, and postnatal morbidity of mothers and offspring were not observed.

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