Primary hyperparathyroidism (PHT) is a frequent and asymptomatic disease in up to 80% of patients. It is due to parathyroidal adenoma in 85% of cases, hyperplasia in up to 15% of cases, and cancer in up to 4% of cases. PHT is exceptionally revealed during pregnancy, and <200 cases are documented in the literature.

The treatment is particularly difficult because the hypocalcemia could be life-threatening for the fetus. In addition, the medical treatments are contraindicated while the use scintigraphy for localizing the adenoma is impossible. PHT therapeutic approach is not well defined especially the last third of pregnancy stage in patients aged 26, 42 and 32-year-old. Despite diagnosis limitations, since scintigraphy is prohibited in pregnancy, the patients were managed conservatively with good prognosis for both mothers and babies.

**Keywords:** Hypercalcemia, parathyroidal adenoma, pregnancy, primary hyperparathyroidism

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**INTRODUCTION**

Primary hyperparathyroidism (PHT) is a frequent and asymptomatic disease in up to 80% of patients. It is due to parathyroidal adenoma in 85% of cases, hyperplasia in up to 15% of cases, and cancer in up to 4% of cases. PHT is exceptionally revealed during pregnancy, and <200 cases are documented in the literature.

The treatment is particularly difficult because the hypocalcemia could be life-threatening for the fetus. In addition, the medical treatments are contraindicated while the use scintigraphy for localizing the adenoma is impossible. PHT therapeutic approach is not well defined especially the last third of pregnancy. We report the management of three cases of PHT at 32, 33, and 23 weeks of gestational age. They revealed hypocalcemia indicating PHT.

**CASE REPORTS**

**Case 1**

The patient was 26-year-old primiparous without pathological history. She demonstrated symptoms of polyuropolydipsia syndrome that suddenly occurred while associating digestive disorders such as unresolved vomiting and abdominal pain; therefore, the phosphocalcic assessment was indicated.

She presented with a threatening hypercalcemia at 33 weeks gestational age associated with a hypophosphoremia and a...
parathormone level that was twice the normal value. Hence, the PHT diagnosis was indicated. The cervical ultrasound revealed two inferior parathyroidal nodules right and left measuring, respectively, 1.6 and 1.1 cm. The abdominal and renal ultrasound revealed a discrete right pyelocalicial dilatation without any sign of renal or pancreatic calcifications. The cardiac ultrasound was normal. A deficiency of Vitamin D was objectified. The maternal and fetal prognosis was compromised since hypercalcemia was persisting despite rehydration measure; then hemodialysis session was done by the 34 weeks of gestational age.

A multidisciplinary approach involving endocrinologist, gynecologist, and surgeon indicated imperative surgery. A conventional cervicotomy under general anesthesia was done and allowed the resection of both parathyroidal inferior adenomas right and left measuring respectively 3 and 5 cm. The anatomicopathological assessment demonstrated parathyroidal adenoma. The fetal cardiac rhythm (FCR) assessment highlighted the indication of a cesarian section that allowed extracting a male newborn weighing 3 kg with an Apgar score of 10/10.

The postoperative follow-up was marked by persisting hypercalcemia with PHT that was 1.2 times the normal level [Table 1]. Scintigraphy using MIBI has highlighted two intense sites in the right level of the thyroidal lobe with multiple sites evoking a parathyroidal hyperplasia.

**Case 2**

A multiparous patient of 42-year-old and without particular pathological history has presented intense nephritic colic associating abdominal pain. This indicated phosphocalcic assessment. Hence, a severe hypercalcemia and hypophosphoremia were recorded. The parathormone rate was 3 times the normal level by the 32 weeks of gestational age. These indices indicated the diagnosis of PHT. The cervical ultrasound revealed an inferior parathyroidal nodule of 3 cm. The abdominal-renal ultrasound revealed a pyelocalicial dilatation without any sign of the renal or pancreatic calcifications. The cardiac ultrasound was performed and allowed the resection of both inferior parathyroidal nodules right and left measuring respectively, 1.6 and 1.1 cm. The abdominal and renal ultrasound revealed an inferior parathyroidal nodule of 3 cm. The cervical ultrasound revealed a small right, well defined lobular cystic lesion measuring 9 mm. The cervical magnetic resonance imaging revealed a nodule under median thyroid measuring 25 by 15 mm with oval shape and well defined regular edge; the lesion was localized in the front, above the range of the sternum, limited behind by the trachea and laterally by both innominate trunks [Figure 1]. The abdominal-renal ultrasound revealed a bilateral medullar nephrocalcinosis of grade II, without any cardiac involvement. Deficiency of Vitamin D was made. The maternal-fetal condition

| Biological parameters | Case 1 | Case 2 | Case 3 |
|-----------------------|--------|--------|--------|
| **Ca²⁺ (mg/L)**       | PTH    | PTH    | PTH    |
| Before surgery        | 125    | 2 times the normal value | 120    | 3 times the normal value | 110 | 5 times the normal value |
| After surgery         | 104    | 1.2 times the normal value | 84     | 2 times the normal value | NA | NA |

NA=Not available, PTH=Parathyroid hormone

Two days later, the serum calcium severely decreased, parathormone became twice the normal rate, and alkaline phosphatases were 10 times the normal level [Table 1]. Hence, the diagnosis of the hungry bone syndrome was established. After an adequate calcium supplementation; the calcemia was normalized after a few days.

**Case 3**

This multiparous patient was 32-year-old who presented with features suggestive of renal lithiasis. She presented with moderate hypercalcemia by the 23rd week of gestational age associated with hypophosphoremia and parathormone that was 5 times the normal level; these indices marked the diagnosis of PHT.

The cervical ultrasound revealed a small right, well confined lobular cystic lesion measuring 9 mm. The cervical magnetic resonance imaging revealed a nodule under median thyroid measuring 25 by 15 mm with oval shape and well defined regular edge; the lesion was localized in the front, above the range of the sternum, limited behind by the trachea and laterally by both innominate trunks [Figure 1]. The abdominal-renal ultrasound revealed a bilateral medullar nephrocalcinosis of grade II, without any cardiac involvement. Deficiency of Vitamin D was made. The maternal-fetal condition

The anatomicopathological examination did not reveal any sign of malignancy. Considering the FCR assessment highlighted an acute fetal suffering, and the cesarian section was indicated. It was achieved 2 days later allowing extracting a female newborn weighing 2500 kg with an Apgar score of 7/10.

Figure 1: (a) T1-weighted magnetic resonance imaging of axial slice is well demonstrating the lesion before contrast injection. (b) T1-weighted magnetic resonance imaging of sagittal slice is well demonstrating the lesion before contrast injection. (c) T1-weighted magnetic resonance imaging of sagittal slice is well demonstrating the contrast enhancement

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improved after adequate hydration, and there was outcome. A multidisciplinary approach involving endocrinologist, gynecologist, and surgeon allowed that surgical indication was imperative after delivery with close monitoring of the maternal and fetal evolvements.

**Discussion**

PHT is a frequent and asymptomatic disease in 80% of patients.\(^1\) It is mostly diagnosed accidently in profiles of hypercalcemia and hypophosphoremia with a raised level of parathormone. Females are mostly affected with the highest incidence among age ranging between 50 and 60 years old.\(^2,3\) However, rare particular hyperparathyroidism (HPT) profiles might occur during pregnancy, and <200 cases were reported in the literature. Indeed, this pathology raises the diagnostic problem especially that scintigraphy using MIBI is contraindicated in pregnancy. Therefore, cervical ultrasound is the only possible diagnostic tool. It has a sensitivity of 69% with a specificity of 94%.\(^4\) During pregnancy, PHT is responsible for maternal complications in 67% of cases, fetal and obstetrical complications in 80% of cases.\(^5,6\) The main maternal complications occurring are renal lithiasis in up to 36% of cases, and acute pancreatitis in up to 13% of cases. In addition, uncontrolled vomiting, muscular weakness, behavioral disorders, and rare cases of fibrous osteodystrophy were reported.\(^7\) The fetal complications consist of intrauterine growths restriction, a low birth weight, and a neonatal hypocalcemia. The maternal-fetal prognosis is compromised in case of persisting hypercalcemia despite rehydration and hemodialysis measures. Our second case demonstrated a fetal suffering after adenoma resection.

The therapeutical approach does not recommend treatments by bisphosphonates and calcitonin. However, bisphosphonates treatment was reported without complication.\(^8\) The calcitonin does not cross the hemato-placenta barrier, but it evokes important anaphylaxis reactions during pregnancy without any efficiency.\(^9\) Thus, surgery remains the only efficient curative treatment. It is usually recommended in the second trimester of pregnancy. Indeed, during the first trimester of pregnancy, the anesthesia might lead to spontaneous abortion while in the last trimester might induce a premature delivery. PHT damage during the last trimester of pregnancy remains controversial.

Schnatz et al. reported a series of 16 cases that were operated in the last trimester of pregnancy with up to 11.8% and 12% of fetal and maternal complications respectively in the postoperative period. Most complications were attributed to a delayed care of HPT and represented 25%.\(^10\) The main surgical complication is hypocalcemia of mothers occurring in 62.5% of cases and 17.6% of infants.\(^11\) This situation is well illustrated by the occurrence of severe hypocalcemia in our second patient that demonstrated a hunger bone syndrome. The outcome is often favorable in case of appropriate treatment.

**Conclusion**

The occurrence of PHT during pregnancy is rare and might threaten the outcome of both, the mother and fetus. The cervical ultrasound is a major diagnostic tool. The Vitamin D assessment should be systematic. While the supplementation in case of hypovitaminosis D is essential to prevent complications.

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**Conflicts of interest**

There are no conflicts of interest.

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