# Growing Teratoma Syndrome: Two case reports

Anju Shrestha1, Hari Dhakal2, Sirish Raj Pandey3, Kapendra Shekhar Amatya4, Sudip Shrestha5, Prakash Nidhi Tiwari6, Srijana lama1

1Department of Surgical Oncology, Gynaecology Unit, Nepal Cancer Hospital and Research Center, Harisiddhi, Lalitpur,Nepal

2Department of Pathology and Laboratory Medicine, Nepal Cancer Hospital and Research Center, Harisiddhi, Lalitpur, Nepal.

3Department of Hospital Research Board, Nepal Cancer Hospital and Research Center, Harisiddhi, Lalitpur, Nepal.

4Department of Surgical Oncology, Nepal Cancer Hospital and Research Center, Harisiddhi, Lalitpur, Nepal.

5Department of Medical Oncology, Nepal Cancer Hospital and Research Center, Harisiddhi, Lalitpur, Nepal.

6Department of Medical Oncology, Pediatric unit, Nepal Cancer Hospital and Research Center, Harisiddhi, Lalitpur, Nepal.

Corresponding Author:

Anju Shrestha, Unit Head, Gynaecology unit, Department of Surgical Oncology, Nepal Cancer Hospital and Research Center,

Harisidhhi, Lalitpur,Nepal.

Email add: anjushr2002@yahoo.co.in

Key Clinical message: In growing teratoma syndrome, the metastatic tumors do not decrease in size despite the normalization of serum tumor markers with chemotherapy. Because of its high recurrence timely complete surgical resection is preferred treatment.

Abstract:

We present two cases of nine and twenty-seven years old girls with recurrence of immature teratoma after an incomplete surgical staging. In both cases, there were huge abdominopelvic masses despite decrease in tumor markers with chemotherapy. Complete surgical resection of these masses was done, and histopathology showed only mature teratoma.

Keywords: chemotherapy retroconversion, growing teratoma syndrome, ovarian germ cell tumor.

Introduction:

Growing teratoma syndrome (GTS) of the ovary is a rare entity encountered with ovarian germ cell tumor in young girls where there is subsequent growth of a benign tumor, following the removal of the primary malignant tumor during or after chemotherapy. Its exact incidence is not known, but few large series reported an overall incidence of 17.8%.[[1]](#endnote-1) [[2]](#endnote-2) [[3]](#endnote-3) However, it is not uncommon in males with testicular malignant non-seminomatous germ-cell tumors.[[4]](#endnote-4) [[5]](#endnote-5) Logothetis et al. have developed three criteria to call GTS. 1. normalization or near normalization of serum tumor markers. 2. increase or persistent of metastatic masses despite appropriate chemotherapy, and 3. The histopathological specimen shows the only mature component of teratoma.[[6]](#endnote-6) This GTS is also named retro chemotherapeutic conversion and was probably the same entity.[[7]](#endnote-7) Here, we report two similar cases of GTS with primary ovarian immature teratoma to add more information regarding this rare disease.

Case 1:

A 10 years old female child had undergone left ovarian cystectomy without proper surgical staging for Grade-2 immature teratoma ovary of 20cmX18cm at a local hospital. No tumor markers were done before surgery, and she was not advised for any adjuvant chemotherapy. Eight months later, she presented in our hospital with a recurrence of huge abdominopelvic masses. (Figure 1 A) A computerized tomography (CT) scan revealed multiple large abdominopelvic mass 12.8X6.3cm; 9.6X6.9cm; 7.4X5.1 cm prehepatic mass, large septated 14.6X12.5cm mass seen in between right dome of the diaphragm and superior surface of the liver(Figure 1 B). Her serum marker were elevated- Alpha-fetoprotein(AFP): 3700ng/ml, CA 125: 181.6u/ml. She received three cycles of chemotherapy: Bleomycin, Etoposide, Cisplatin, Cyclophosphamide. Her AFP level markedly decreased to 178.2 ng/ml with chemotherapy, but no change was seen in tumor masses size. With the diagnosis of growing teratoma syndrome, laparotomy with left ovariotomy and complete excision of abdominopelvic mass including suprahepatic mass with preservation of the normal-looking small uterus and right tube and ovary was done(Figure 2 A). During surgery, transection of the left ureter occurred, primarily repaired with insertion of D-J stent for six weeks. The postoperative period was uneventful, and she was discharged on the 6th postoperative day. Final histopathological examination of the specimen showed only a mature component of the teratomatous element(Figure 2 B). She received three more cycles of chemotherapy of the same regime. After two and half years, at the age of 12 years, she had her normal menstrual cycle. Currently, she is on regular follow-up and in a disease-free state until this report, which is five years and four months after the second operation.

Case 2:

A 27 years old female, para 1, had previously undergone ovarian cystectomy for immature teratoma without proper surgical staging and adjuvant chemotherapy at a local hospital. She underwent second surgery with a total abdominal hysterectomy and bilateral salpingo-oophorectomy with omental biopsy for relapse of immature teratoma in the same hospital after ten months. Post-surgery, she received multiple lines of adjuvant chemotherapy there including; 3 cycles of Etoposide and Cisplatin; 2 cycles of Paclitaxel, Ifosphamide, and Cisplatin; three cycles of Gemcitabine and Carboplatin over ten months. Despite all the treatment due to the progressive increment of tumor mass, she was referred to our hospital. A Magnetic Resonance Imaging ( MRI) revealed a giant abdominopelvic mass of 18X17 cm compressing bladder; 6.5X 6.3 cm mass right paracentral anterior abdominal wall involving right rectus abdominal muscles; 15.7X10.7cm right subcapsular region of the liver (Figure 3 A and 3 B). Her serum markers were CA125: 150.3 u/ml, CA 19.9: 709.68u/ml, AFP: 2.2ng/ml. She then underwent a third laparotomy at our center with complete excision of pelvic mass, appendectomy, total omentectomy, suprahepatic liver mass resection, and pelvic and lateral parietal peritonectomy (Figure 4 A). At the time of dissection of tumor from sigmoid colon, small perforation occurred, which was primarily repaired in two layers in the same setting. Her postoperative period was uneventful, and she was discharged on ten postoperative days. Final histopathological examination showed only mature teratoma( including gliomatosis and keratinous cysts) without viable germ cells (Figure 4 B). Post-surgery, she received three more cycles of chemotherapy: Vincristine, Dactinomycin, and Cyclophosphamide (VAC regime). A small 6X6 cm extraperitoneal suprapubic mass was noted after 3rd cycle of chemotherapy, which was resected out and showed only mature teratoma in histopathology. The patient remains in disease-free condition until this report, which is nine months after the last operation.

Discussion:

Even though the etiopathogenesis of GTS is debatable, most two hypothesis that widely accepted are: immature component of malignant cells are cured with chemotherapy, but mature benign teratomatous elements are resistant and remains same; totipotent malignant germ cell is transformed towards benign mature teratoma due to alteration of the cell kinetics by chemotherapy.[[8]](#endnote-8) [[9]](#endnote-9)

Most of the time, immature teratoma presents in a younger patient, the youngest age being reported as five years old, where patients usually had unilateral salpingoo-oophorectomy only for fertility preservation.[[10]](#endnote-10) Different cases reported that GTS had developed from 3 months to even eight years later, usually after incomplete surgical staging.[[11]](#endnote-11) [[12]](#endnote-12) [[13]](#endnote-13) The possible mechanism of this may be due to micrometastasis of immature teratoma cells within the peritoneal cavity. Both of our patients developed recurrent masses within a few months after an incomplete surgical staging.

GTS can grow rapidly even during the chemotherapy period, may cause pressure effects on great vessels, ureter, and bowel, leading to venous thrombosis, hydronephrosis, bowel obstruction, and fistula formation but mostly concise intraperitoneally.[[14]](#endnote-14) Even our patients had left ureter encasement by the tumor in the first case and sigmoid serosal involvement in the second case. Since these tumors are resistant to chemotherapy and radiotherapy, surgery remains a gold standard treatment. Complete surgical excision is feasible even in large tumor masses and in recurrence settings also. In both patients, we were able to excise masses completely without much morbidity and even preserve the fertility in the first case. However, mortality and morbidity depend upon the decision of the timing of surgery. An early decision regarding total resection of masses can decrease morbidity and preserve the patient's fertility. Most of the time, mortality related to GTS is due to postoperative complications and poor patient's general condition.8

GTS of the ovary has an excellent prognosis with reported five-year overall survival of up to 89-90% who had a complete surgical resection.14 [[15]](#endnote-15) However, regular follow-up is essential, as recurrence has been reported even after ten years and after complete resection.12,14,[[16]](#endnote-16)

Conclusion: In growing teratoma syndrome, the metastatic tumors do not decrease in size despite the normalization of serum tumor markers with chemotherapy. Because of its high recurrence and insensitiveness to chemotherapy, timely complete surgical resection is the preferred treatment, and fertility-sparing surgery should be considered for women of childbearing age wherever possible.

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Ethical Approval: Not Applicable

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Written informed consent: Yes

Written informed consent was obtained from the patient's mother in the first case and the patient and husband in the second case to publish these case reports and any accompanying images.

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