Immature ovarian teratoma

Factfile immature teratoma of the ovary
• rare variant of ovarian germ cell tumor
  – < 3% of all teratomas,
  – < 1% of all ovarian malignacies
  – ~20% of all germ cell tumors
• ~10% of the cases contralateral benign (cystic) teratoma
• 90% of the patients < 30 years of age, mean age 19 yrs
• Serum markers might be elevated (esp. AFP and HCG)
• 6 – 35 cm in diameter (average 18cm)
• CF: predominantly solid, fleshy, sometimes cystic

Tasks for the handling and reporting of immature ovarian teratomas
• Exclusion of benign solid teratoma

• Determining the grade of the tumor
  – Grading based on the extent of immature tissue within the teratoma
  – In the past tailored on immature neuroepithelium (because of this tissue is most recognisable and increases the reproducibility)
  – 3-tiered grading system

Grading in immature teratoma (Gonzales-Crussi)
• Grade 1
  – Occasional foci of immature tissue: <1 one low power field (x40) in a given slide ➔ no adjuvant chemotherapy required
• Grade 2
  – 1-4 low power fields per slide ➔ adjuvant chemotherapy required
• Grade 3
  – > 4 low power fields in a given slide ➔ adjuvant chemotherapy required
• Tumor grade is the crucial feature for determining the prognosis and the necessity of adjuvant treatment
• sometimes a two tired grading system (low versus high grade) was suggested (O`Connor & Norris 1994)
• some authors suggest that surgical resection alone might be curative, reserving polychemotherapy (bleomycin, etoposide and cisplatin, i.e. BEP scheme) for cases with relapse (Cushing et al. 1999)

➔ to ensure adequate diagnosis and adequate grading of the lesion, adequate sampling is required: **one block per 1-2cm of largest tumor dimension** !!

**Immature Tissue within Teratoma**

- **Immature ectodermal tissue**
  - Mainly neuroectodermal rosettes and tubules

- **Immature mesenchyme**
  - Loose myxoid stroma with focal differentiation into
  - Immature cartilage
  - Immature fat
  - Osteoid, rhabdomyoblasts

- **Immature endodermal tissue**
  - Hepatic tissue
  - Intestinal type epithel with basal vacuolisation
  - Embryonic renal tissue with Wilms tumor

- it has been proposed that high-grade immature teratomas are characterised by the presence of immature neuro-epithelial structures and low-grade tumors by the presence of somite organogenesis (Cho et al. 2005)

- theoretically, any of the immature elements might be quantitated for grading purpose, but immature neuroepithelium is the easiest to assess (Norris et al. 1976)

**Differential diagnoses of immature ovarian teratomas**

- **mature teratoma** with foci of immature neuroepithel. tissue
  - occasionally, mature teratomas might contain minute foci of immature tissue (i.e. <21mm²)
  - a study of 360 ovarian teratomas that contain immature tissue included 350 immature teratomas and only ten mature cystic teratomas with microfoci of immature tissue
  - during a follow up of 11 months to 7 years none of the latter cases recurred
  - this study suggests that the dx of immature teratoma is not appropriate when only minute foci of immature tissue is
present in an otherwise mature cystic teratoma (Yanai-Inbar & Scully 1987))

- but, adequate sampling is required !!

- **monodermal teratoma** with malignant somatic type tumors →
teratoma exclusively or predominantly composed of a single type
tissue, derived from 1 embryonal layer and adult type malignant
tumor
  - malignant cell type in malignant transformation is directly
    related to the predominant mature cell type
  - e.g. struma ovarii can develop into a papillary thyroid
    carcinoma in <5%
  - in bi- and triphasic mature teratoma, squamous cell
    carcinoma is the most common type of malignancy (0.5-2%
    and typically occurs in post-menopausal women (Hackethal
    et al. 2008)
  - treatment of malignant transformation of mature teratoma is
    based on the cell type of the tumor

- **MMMT** → admixture of primitive appearing tissues without
  organisation into coordinated tissue units with recognisable
  embryonal/fetal structures

**Schedule for the differential diagnoses of immature ovarian teratomas**

**Germ cell tumors with teratomatous features**

- **Immature Teratoma**
  - Grading important

- **Mature T with foci of immaturity**
  - Dermoid cyst with foci of neuroepithelial tissue (<21 mm²) →
    benign

- **Monodermal T with malignant somatic type tumors**
  - Ependymoma → benign
  - PNET → maligne
  - Glioblastoma → maligne

Adequate sampling is required

WHO 2003, IJGP 1987;6:203
References


Yanai-Inbar I, Scully RE. Relation of ovarian dermoid cysts and immature teratomas: an analysis of 350 cases of immature teratoma and 10 cases of dermoid cyst with microscopic foci of immature tissue. Int J Gynecol Pathol. 1987;6(3):203-12