Original Article

The Histopathological Pattern of Ovarian Teratomas at a Tertiary Care Centre

1. Amin uddin Sheikh 2. Inayat ur Rahman 3. Shaikh Sajjad Ahmed 4. Saleem Sadiq 5. Rafiq Khanani 6. Gull e Atif

1. Asstt. Prof. of Pathology LCM&D, Karachi 2. Asstt. Prof. of Biochemistry, MIHS, Rawalpindi 3. Assoc. Prof. of Microbiology, KM&DC, Karachi 4. Prof. of Pathology, JPMC, Karachi 5. Prof. of Pathology, DUHS, Karachi 6. Prof. of Pathology, MIHS, Rawalpindi

ABSTRACT

Objective: 1)To determine the frequency and types of various ovarian teratomas amongst various age groups. and 2) To compare the results with other workers.
Study Design: Retrospective study.
Place and Duration of Study: The study was conducted at the Department of Pathology, Basic Medical Sciences Institute(BMSI), Jinnah Post graduate medical centre(JPMC), Karachi from 1st January 2001 to 31st December 2005.
Materials and Methods: 1128 cases of ovarian biopsies were received for histopathological examination at the Department of Pathology, Basic Medical Science Institute, JPMC,Karachi.Out of 365 cases of ovarian neoplasms teratomas were separated, analyzed and classified according to the WHO classification system 1994 and their relative frequencies were recorded.
Results: Teratomas account for 14.52% (53/365) of all ovarian neoplasms. Mature cystic teratomas were the most common i.e 86.80%(46/53).Immature teratomas were 9.43%(05/53) followed by special subtypes 3.77%(02/53)
Conclusion: Mature cystic teratomas are the most common germ cell neoplasms of ovary. Immature teratomas are rare above 30 years of age.
Key Words: ovary, mature, immature, teratoma.

INTRODUCTION

Ovarian teratomas are the most common germ cell neoplasm and in many series, the most common excised ovarian neoplasm. Teratomas comprise a number of histologic types of tumors, all of which contain mature or immature tissues of germ cell (pleuripotential) origin. The most common of these tumors, the mature cystic teratoma (also known as dermoid cyst), typically contains mature tissues of ectodermal (skin,brain), mesodermal (muscle, fat) and endodermal (mucinous or ciliated epithelium) origin. In monodermal teratomas, one of these tissues types(eg, thyroid tissue in struma ovarii, neuroectodermal tissue in carcinoid tumor) predominates .Mature cystic teratomas (a more appropriate term than the commonly used "dermoid cysts") are cystic tumors composed of well-differentiated derivations from at least two of the three germ cell layers (ectoderm, mesoderm, and endoderm).They affect a younger age group (mean patient age, 30 years) than epithelial ovarian neoplasms[1].Mature cystic teratoma is the most common germ cell neoplasm and, in some series, the most common ovarian neoplasm removed at surgery. It is the most common ovarian mass in children[2].Mature cystic teratomas arise from a single germ cell after the first meiotic division. In contrast to mature cystic teratoma, malignant transformation occurs in the 6th or 7th decade of life[3]. Like mature cystic teratomas, immature teratomas are composed of tissues derived from the three germ layers. Immature teratoma of the ovary is an uncommon tumor comprising 1% of ovarian malignancies. The amount of immature neuroepithelium in the teratoma is an important prognostic factor[4].At initial manifestation, immature teratomas are typically larger (14–25cm) than mature cystic teratomas (average,7cm)[5,6]. They may be solid or have a prominent solid component with cystic elements[7].Mature tissue elements similar to those seen in mature cystic teratoma are invariably present. Tumor grading is based on the amount of immature tissue present. Recently, the amount of yolk sac tumour within immature teratomas has been recognized as both the source of alpha-fetoprotein in affected patients and the major predictor of stage, grade and rate of recurrence[8].Monodermal teratomas are composed predominantly or solely of one tissue type. There are three main types of ovarian monodermal tumours: struma ovarii, ovarian carcinoid tumors, and tumors with neural differentiation. Struma ovarii accounts for

approximately 3% of all mature teratomas. Struma ovarii is composed predominantly or solely of mature thyroid tissue that demonstrates acini filled with thyroid colloid . Such thyroid tissue can occur as a minor component of mature cystic teratomas, but in struma ovarii it is the predominant or sole tissue type[9]. In this study we tried to find out the histopathological patterns of ovarian teratomas which are more frequent in our population and whether they are significantly different from other populations.

MATERIALS AND METHODS

This study was conducted at the Department of Pathology, Basic Medical Sciences Institute, Jinnah Postgraduate Medical Centre, Karachi, from 1st January 2001 to 31st December 2005. Patients 20-years of age and having clinical or pre-operative diagnosis of ovarian tumours were included in the study, while the female with inflammatory masses and chocolate cysts were excluded from the study. Detailed history ,physical examination , age, symptoms, duration of disease and family history were retrieved from clinical data recorded. All the patients had baseline investigations and ultrasound examination. A total of 1128 ovarian biopsies were registered for histopathological examinations in the Department of histopathology, Basic Medical Sciences Institute, JPMC, Karachi. A total of only 365 cases were found neoplastic ovarian lesions. All biopsy specimens for histological examination were fixed in 10% formalin, embedded in paraffin wax on the oriented edge, and cut into 5 µm thick sequential sections. All tissue sections were routinely stained with haematoxylin and eosin for histological examination. Out of 365 neoplastic lesions only 53 cases were ovarian teratomas. The specimen slides were examined in detail by author and reviewed by his senior histopathologist.

RESULTS

Table No. 1: Nos and Percentages of Ovarian Neoplasms and Teratomas

Total Ovarian Biopsies	1128
Total Ovarian Neoplasm	365 (32.25%)
Total Ovarian Teratomas	53 (14.52)

Table 1 shows that a total of 1128 ovarian biopsies were reviewed in the mentioned period and only 32.35% ovarian biopsies were found to be neoplastic lesions. Ovarian teratomas were diagnosed in only 53 cases that comprises about 14. 52% of total neoplastic ovarian biopsies.

Nos. and Percentages of Ovarian Neoplasms and Teratomas

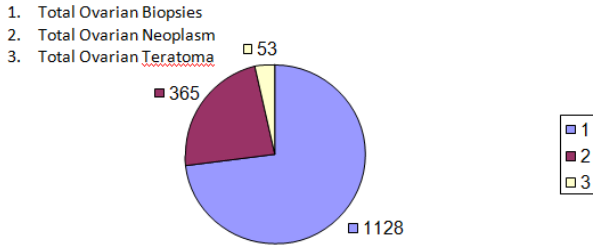

Table No.2: Frequency of various ovarian Teratoma

Mature (Benign)	46 (86.80%)
Immature (Malignant)	05 (9.43%)
Monodermal (Struma ovary)	02 (3.77%)

Table No. 2 shows that out of all diagnosed ovarian teratomas(53cases),most common were mature teratomas (86.80%) , immature teratomas were very less common (9.43%) and monodermal teratomas (3.77%) were least common.

Table No.3: Age Distribution of Mature (M), Immature (Im) & Monodermal (Mo) Teratomas

Age group	2001			2002			2003			2004			2005			Total		
	M	IM	MO	M	IM	MO	M	IM	MO	M	IM	MO	M	IM	MO	M	IM	MO
1-10 YRS	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
11-20 YRS	…	01	…	…	…	…	…	…	…	01	…	…	02	…	...	03	01	…
21-30 YRS	03	…	02	03	02	…	04	01	…	03	…	…	06	01	…	19	04	02
31-40YRS	03	…	…	04	…	…	01	…	…	03	…	…	03	…	…	14	…	…
41-50YRS	…	…	…	01	…	…	01	…	…	01	…	…	…	…	…	03	…	…
51-60YRS	…	…	…	…	…	…	01	…	…	02	…	…	02	…	…	05	…	…
61-70YRS	…	…	…	…	…	…	…	…	…	…	…	…	01	…	…	01	…	…
71-80YRS	01	…	…	…	…	…	…	…	…	…	…	…	…	…	…	01	…	…

Table 3 shows that the commonest age group for mature teratomas was 21-30 in which a total of 19 cases (42.23%) out of 46 were seen.The commonest age group for immature teratomas was also 21-30 years in which 4(80%) out of the total cases were seen. Both the cases of monodermal teratomas seen were in age group of 21-30 years. Minimum age in mature teratoma was 14. The maximum age in mature teratoma were 75 years, immature 30 years and in monodermal teratoma it was 27 years.

Table No.4: Laterally Among the Various Ovarian Teratomas

Year	Left Side	Right Side	Bilateral	Nos
2001	02	03	01	04
2002	03	03	00	04
2003	02	02	00	04
2004	01	02	01	07
2005	03	02	00	09

Table 4 shows that in 28 cases (52.8%) which is more than 50% of all teratomas are NOS(Not Otherwise Specified) where laterality was not defined. In the 25 cases where laterality was defined, 11(44%) were left sided, 12 (48%) were right sided and 02(08%) were bilateral.

DISCUSSION

Ovarian teratomas represent about 15% of all ovarian neoplasms. Their incidence is about 10 per 100 000 women per year. Most teratomas are benign and their peak incidence is around the third and fourth decades of life[10,11].This is in agreement with our study as we found 14.52% ovarian teratomas out of all ovarian neoplasms.

Mature cystic teratoma is the most common germ cell neoplasm and, in some series, the most common ovarian neoplasm removed at surgery[12,13].In our study out of a total of 1128 ovarian biopsies, a total number of 365 cases (32.35%) were found to be neoplastic lesions and ovarian teratomas were diagnosed in 53 cases (14.52%).Mature ovarian teratomas were the most frequent type(86.80%) throughout the five years with the commonest age group was 21-30 years.The reported frequency of benign cystic teratoma 61.54% in a study conducted by Jadhav Balaji et al**[14]** is in agreement with our study. A retrospective study of 283 consecutive cases of mature cystic teratomas of the ovary, operated at national Taiwan univetsity hospital **[15]** between 1988 and 1993 was undertaken. The incidence of mature cystic teratoma was 32.6% of primary ovarian neoplasm. A retrospective study at Agha Khan University Hospital **[16]**,Karachi from 1993–98 and another study done by Abdullahi Mohammed et al[17] in April 2010 showed the benign cystic teratoma to be the commonest benign tumour (35.17%) and (29%) respectively and both studies are in accordance with our study. Regarding the age group our study is also in agreement with the study done by shatrughan et al 2004 **[18]** who found the largest number of cases in patients between the ages of 20 and 30 years.

Our results show commonest age group for immature teratomas was 21-30 years in 4 (80%) out of the total of 05 cases so we found large number of immature teratoma cases in third decade of life. Talerman **[19]** demonstrate that immature teratomas behave clinically malignant, are much less common (<1% of ovarian teratomas),affect a younger age group usually during the first 2 decades of life. This disaccordance in age group of patients with Talerman study could be due to a weakness of our study that is the small number of immature teratomas ,only five in number and hence its limited statistical power. It is important to diagnose the presence of these tumors as early as possible to reduce complications before they increases in size.

In our results both the cases of monodemal teratomas seen were in age group of 21-30 years represent 3.77% of total ovarian teratomas. Alfie et al demonstrate that inside the germinal neoplasms of the ovary, the monodermic or specialized teratomas constitute a not very frequent variety. The struma ovarii represents 2.7% as the form more common of this teratomas type, constituted by thyroid tissue**[20]**.Out of three studies **[21,22,23]** conducted in india, the reported frequency of struma ovarii varies from1.4% to15.4%. Jadhav Balaji et al**[14]** also observed frequency of monodemal teratomas 9.09% in a 3 years study which is comparable with our study but number of cases (only 3) show rarity of the condition in our part. Further research is indicated to determine the impact that this finding may have on women's health.

Finding dermoids as early as possible could improve the health of patients who live with complications from such masses. This phenomenon, if verified, is significant, especially in infertility cases and in cases of right ovarian thrombosis complications, which might lead to death. Ovarian thrombosis occurs 80% to 90% of the time on the right ovary. The literature is inconclusive on the frequency of right- and left-sided unilateral dermoids.8% to 20% of these masses are located bilaterally[24.]Dermoid masses may be located more often on the right side. It is the author's opinion that this is consistent with design theory, which recognizes that evolution, by natural selection of inherited variations across the generations, simulates a rational engineering process in optimizing the performance or function of living organisms in relation to their lifestyles.[25]The configuration of the sigmoid colon may be an influencing factor in incidences of pelvic sidedness. The sigmoid colon is curved in an "S" shape and descends in the left lower quadrant. In our study the 25 cases where laterality was defined, 11(44%) teratomas were left sided comparable to 39.7% reported by Shatrughan et al **[17]** and 40.6% by Wu et al **[15]**.In our results 12 (48%) were right sided also comparable to 35.5 % reported by Shatrughan et al **[17]** and 51.2% reported by Wu et al **[15]** .Our study results where 02(08%) cases involved bilaterally show agreement with 8.2% demonstrated by Wu et al**[15]** but show disagreement with significantly high 24.8% reported by Shatrghan et al**[17].** In this relation our study is inconclusive because in more than 50% cases

laterality was not defined as well as small sample size provide insufficient information regarding laterality.

CONCLUSION

This study has used a quantitative approach to determine the frequency of ovarian teratomas at a tertiary care centre of Karachi in five years. Observations and data analysis of the results indicate that mature cystic teratoma was the commonest (86.80%) of the ovarian teratoma. They occur primarily during the reproductive years, but may occur in the postmenopausal periods or in childhood. Immature teratoma were less common (9.4%) and stuma ovarii the least common (3.77%).Knowledge regarding laterality of tumors were inconclusive . Further study is recommended to establish if these are significant findings.

REFERENCES

1. Brown MF, Hebra A, McGeehin K, Ross AJ III. Ovarian masses in children: a review of 91 cases of malignant and benign masses. J Pediatr Surg 1993;28:930–933.
2. Eric K. Outwater, Evan S, Siegelman, Jennifer L, Hunt. Ovarian Teratomas:Tumor Types and Imaging Characteristics. J Radio Graphics 2001; 21:475–490
3. Comerci JT Jr, Licciardi F, Bergh PA, Gregori C,Breen JL. Mature cystic teratoma: a clinicopathologic evaluation of 517 cases and review of the literature. Obstet Gynecol 1994; 84:22–28.
4. Abiko, Kaoru, Mandai, Masaki, Hamanishi, Junzo, Matsumura, et al. Expression in Immature Teratoma of the Ovary: Relevance to Histologic Grade and Degree of Differentiation. AMJ Surg Pathol 2010; 34(12):1842–1848.
5. Eric K, Outwater, Evan S, Siegelman, Jennifer L, Hunt. Radio graphics 2001;21:475-490.
6. Heifetz SA, Cushing B, Giller R, et al. Immature teratomas in children: pathologic considerations: a report from the combined Pediatric Oncology Group/Children's Cancer group. AMJ Surg Pathol 1998; 22:1115-1124.
7. Kido A, Togashi K, Konishi l, et al. Dermoid cysts of the ovary with malignant transformation MR appearance. AMJ Roentgenol 1999;172: 445-449.
8. Koonings PP, Campbell K, Mishell DR Jr, Grimes DA. Relative frequency of primary ovarian neoplasms: a 10-year review. Obstet Gynecol 1989; 74:921–926.
9. Clement PB, Young RH, Scully RE, Clinical syndromes associated with tumors of the female genital tract. Semin Diagn Pathol 1991; 8:204 - 204-233.
10. Vessey M, Metcalfe A, Wells C, Mcpherson K, Westhoff C, Yeates D. Ovarian neoplasms, functional ovarian cysts, and oral contraceptives. Br Med J 1987; 294, 1518-1521.
11. Westhoff C, Pike M, Vessey M. Benign onarian teratomas: a population-based case-control study. Br J Cancer 1988;58:93-98.
12. Koonings PP, Campbell K, Mishell DR Jr, Grimes DA. Relative frequency of primary ovarian neoplasms: a 10-year review. Obstet Gynecol 1989;74: 921–926.
13. Whitecar MP, Turner S, Higby MK. Adnexal masses in pregnancy: a review of 130 cases undergoing surgical management. AMJ Obstet Gynecol 1999; 181: 19–24.
14. Jagannath JB. Shinde Mangala Ashok Ovarian germ cell tumor: A 3 years study. J Obstet Gynecol India 2005; 55(1): 61-63
15. Wu RT, Torng PL, Chang DY, Chen RJ, Lin MC, Huang SC. Mature cystic teratoma of the ovary: a clinicopathologic study of 283 cases. Department of Obstetrics and Gyneocology, College of Medicine and the Hospital, National Taiwan University, Taipei, R.O.C. Zhonghua Yi Xue Za Zhi (Taipei) 1996;58(4):269-74.
16. Ahmed Z, Kiyani N, Hasan S. H, Muzaffar S. Gill M. S.Histological Patterns of ovarian neoplasia. J Pak Med Assoc 2000;50:416–9
17. Abdullahi Mohammed, Malami SA, Calvin B, Abdullahi K. A histopathological study of ovarian neoplasms in children in a tertiary hospital of northern Nigeria. African J of Paed Surg 2010;7(2):75-77.
18. Sah SP, Uprety D, Rani S. Germ cell tumors of the ovary: A clinicopathologic study of 121 cases from Nepal. J of Obst and Gynaecol Res 2004; 30(4):303.
19. Talerman A. Germ cell tumors of the ovary. In: Kurman RJ, editor. Blaustein's pathology of the female genital tract. 4th ed. New York: Springer-Verlag;1994.p.849-914.
20. Alfie cohen l, Castillo Aguilar E, Sereno Gomez B, Martinez Rodriguez O. Struma ovarii; a variety of monodermic teratoma of the ovary. Report of 8 cases. Ginecol Obstet Mex 1999;67: 153-7
21. Jacob S, Lalitha K, Gopalkrisinan K, et al. Malignant ovarian tumors-A profile. J Obstet Gynecol Ind 1993;43:413-7.
22. Bharti M, Sen S, Dewan R, et al. Ovarian germ cell tumor –A clinical profile and management-4 years study. J Obstet Gynecol Ind 2003;53: 62-5.

23. Couto F, Nadkarni NS, Rebello MJ. Ovarian tumors in Goa: A clinicopathological study. J Obstet Gynecol Ind 1993;43:408-12.
24. Ismail SR. An Evaluation of the Incidence of Right-Sided Ovarian Cystic Teratoma Visualized on Sonograms. J of Diag Med Sonography 2005;21: 336
25. Pelusi G, Taroni B, Flamigni C. Benign ovarian tumors. Frontiers Bio Sci 1997;2:5–7.

Address for Corresponding Author:
Amin uddin Sheikh,
Asstt. Prof. of Pathology,
Liaqat College of Medicine & Dentistry,
Karachi.