

Mucinous Tumors of Ovary

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Summary

This is a retrospective study undertaken to evaluate the clinical features, histology, macroscopic findings and behaviour of mucinous tumors of the ovary. All mucinous tumors of ovary diagnosed at Gujarat Cancer and Research Institute from January 1990 to December 1998 were taken for study. Total number of patients was 46.

47.8% of the cases of mucinous tumors in the present study were between the age group of 20-40 years. The commonest symptoms with which the patients presented were abdominal distension (65.2%) and pain in abdomen (28.2%). 73.9% patients had palpable mass and 43.4% had ascities on clinical examinations. 10.9% patients had tumors of more than 25cm in size which were either benign or borderline on final histopathology. As mucinous tumors acquire large size they present in earlier stages. In our study 40.5% patients were in stage I & II and 18.9% in stage III & IV. 82.6% patients had clinically unilateral mucinous tumors but the final histopathology revealed microscopic metastasis in 6.5% of the contralateral ovary. 56.5% patients had malignant pure mucinous tumors, 6.5% had malignant mixed (mucinous + serous) tumors, 17.4% had borderline mucinous tumors and 19.5% had benign mucinous variety. Malignant and in some cases borderline mucinous tumors were treated with chemotherapy.

Introduction

Ovarian cancer remains the most lethal Gynecological malignancy. 47% of all deaths from cancer of the female genital tract occur in women who have gynecological cancer of ovarian origin. It occupies 5th rank among female malignancies and constitutes 7.5% of all gynecologic cancer and 3.5% of all cancers in women. The incidence in India is 6-7 per hundred thousand population.

Epithelial tumors are the commonest type, approximately 90% of all malignant tumors. Among these, the most common is the serous type followed by mucinous carcinomas which forms 6.6%. Serous type tumors tend to show slightly greater degree of uniformity than do mucinous tumors which are notorious for great variation.

Mucinous tumors of the ovary resemble the simple mucus secreting columnar epithelium of the endocervical type sometimes mixed with intestinal type. Mucinous cystadenoma, a benign variety, accounts for 15 percent of benign ovarian tumors. Only 5 percent are bilateral. The majority of giant tumors of ovary are mucinous cystadenoma.

Mucinous low malignant potential tumors (LMP) or borderline tumors are three times as common as mucinous carcinomas. 80-90% are in stage I at diagnosis. Less than 5% are bilateral. An entirely benign neoplasm is found with the same frequency as another LMP tumor in the contralateral ovary. Mucinous carcinoma accounts for only 10-15% of ovarian carcinomas. 50% are diagnosed before extrapelvic spread. Metastasis from an intestinal primary tumor should be considered when ovarian mucinous cancer is

predominantly solid.

Mucinous tumors often exhibit a wide variation in histological composition, requiring very thorough sampling of whole tumor to avoid missing areas of borderline and frank malignancy.

Materials and Methods

All mucinous neoplasms of the ovary diagnosed at Gujarat Cancer and Research Institute from January 1990 upto December 1998 were included in this retrospective study undertaken to evaluate the clinical features, histology, macroscopic findings and clinical behaviour of these tumors.

The details regarding the age, symptoms, clinical examination and operation were evaluated. If operated outside, the details regarding the operation and histology was inquired. On histopathological examination the details regarding the size, type, nature and stage of the tumors were evaluated. All the malignant variety and some cases of borderline variety were treated with chemotherapy.

Observations and Results :

Table I
Age distribution

Age	No. of patients
<20 years	2 (4.3%)
20-40 years	22 (47.8%)
>40 years	22 (47.8%)

(a) **Age Distribution:**

As seen in the Table I most of our patients of mucinous tumors in this study were between the age group of 20 to 40 years (47.8%) and beyond 40 years (47.8%).

Table II
Clinical Presentation

Symptoms	No. of patients
Abdominal distention	30 (65.3%)
Pain in abdomen	13 (28%)
Menstrual disorder	8 (17%)
Not known	3 (6.5%)
No complaint	1 (2.1%)
Others	3 (6.5%)

(b) **Clinical Presentation:**

As shown in Table II, the most common symptoms the patients presented with were abdominal distension. (65.2%) and pain in abdomen (28.2%). 17.3%

patients had menstrual disorders and 6.5% had other complaints while 2.1% were asymptomatic during their first visit. 4.3% patients presented with pregnancy and palpable mass. On clinical examination 73.9% patients had palpable mass and 43.4% had ascites.

Table III
Operative Details

Type of surgery	G.C.R.I	Outside
TAH +BSO alone (without staging)	-	10
Complete Surgery (Staging Laparotomy)	20	-
Suboptimal debulking	5	-
USO only	3	2
Post Hysterectomy Surgery (Oophorectomy)	3	3
Restaging Laparotomy	4	-

G.C.R.I. = Gujarat Cancer and Research Institute
TAH + BSO = Total abdominal hysterectomy and Bilateral Salpingo-oophorectomy
USO = Unilateral salpingo-oophorectomy

(c) **Operative Details :**

The details of various operative procedures are depicted in Table III.

The details of patients operated outside.

Fifteen patients were operated outside and then referred to us for further management. Of these 2 patients presenting with pregnancy and palpable mass, had undergone tumor removal i.e. unilateral salpingo-oophorectomy only. All these 15 patients were advised restaging laparotomy with completion of surgery before chemotherapy. It was performed in 3 patients only.

The details of patients operated in G.C.R.I.

Twenty five patients underwent staging laparotomy with complete debulking in 20 patients and suboptimal debulking in 5 patients. Three patients having suspicious looking appendix had undergone appendectomy also. Oophorectomy and staging was performed in 3 patients who had been hysterectomised previously. These 3 had either benign or borderline tumors. Three patients were young and desired child bearing. Unilateral salpingo-oophorectomy was performed. These patients had unilateral tumors confirmed by frozen section to be benign. Hence in these cases the uterus and opposite ovary were preserved.

Four patients had undergone restaging laparotomy. Among these 4, 2 patients, who were pregnant and had palpable mass had undergone USO only outside. They underwent restaging and completion of surgery, one during midtrimester and one after delivery. Of the other 2 patients, one had undergone primary surgery elsewhere but agreed for restaging laparotomy at our institute and the other was re-explored after giving 6 courses of chemotherapy.

Table IV
Stage

Stage	No. of patients
Ia	6
Ib	2
Ic	2
IIa	1
IIb	2
IIc	2
IIIc	6
IVb	1
Unstaged	15

(d) Stage and Laterality:

As seen in the table IV, most of our patients ie 40.5% were in stage I & II and 18.9% patients were in stage III & IV. 15 patients ie (40.5%) were not properly staged as they were operated outside.

On exploration 38 patients (82.6%) had unilateral tumors macroscopically and 6 (13.04%) had bilateral tumors. But on final histopathological examination, 3 patients (6.5%) having seemingly unilateral tumors had microscopic metastasis in the other ovary.

(e) Size of Tumors:

Table V shows the number of patients having mucinous tumors presenting with varying size. Thirty three patients ie 71.7% presented with tumors varying between 10-25cm in size. Among them 24 patients had malignant tumors. Five patients had tumors more than 25cm in size and they were either benign or borderline in nature.

Table V
Size of Tumor

Tumor	Benign	Borderline	Malignant	No. of Patients
<10 cm	2	1	2	5 (10.9%)
10-25 cm	4	5	24	33 (71.7%)
>25 cm	3	2	-	5 (10.9%)
NK	-	-	3	3 (6.5%)

Table VI
Pathological Findings

Histopathology	No. of Patients
Malignant (pure Mucinous)	26 (56.5%)
Malignant (Mucinous & Serous)	3 (6.5%)
Borderline	8 (17.4%)
Benign	9 (19.5%)

(f) Pathological finding:

On final histopathological report 56.5% patients had malignant pure mucinous tumors, 6.5% had malignant mixed (mucinous & serous) tumors, 17.4% patients had borderline variety and 19.5% patients had benign variety (Table VI)

Although 43.7% patients presented with ascites it was positive for malignancy in only 6.67% patients. Three patients who had undergone appendicectomy had metastasis in appendix but not of intestinal variety. The primary was ovarian in origin in these patients.

(g) Management:

Three patients having either borderline or malignant mucinous tumors were observed. They were operated in our institute and were in stage Ia and reliable for follow up.

Single agent chemotherapy was given to 3 patients. One was a 70 year old patient with stage II borderline tumor. The other 2 were in stage Ia but had giant tumors. Large size is considered to confer poorer prognosis.

Twenty nine patients with stage more than Ia were given multiple agent chemotherapy ie cisplatin and cyclophosphamide (C+P) combination. One patient developed recurrence following C+P regime. She was given salvage therapy in the form of Carboplatin and Ifosphamide. One patient was put on Intaxel as she had poor response to C+P regime and she could afford the cost.

Table VII
Management

Management	Nature of Tumor		No. of Patients
	Boderline	Malignant	
Observation	1	2	3
Single Agent CT. (Tab. Melphalan)	1	2	3
Multiple Agent			
• C+P	6	23	29
• Carbo + Ifosphamide		1	1
• C+ P + Intaxel		1	1

C+P = Cisplatin + Cyclophosphamide

Carbo + Ifosphamide = Carboplatin + Ifosphamide

Table VIII
Follow Up

Status	No. of Patients	
Disease Free	25 (follow up 6 to 30 months)	70%
Lost to Follow	6 (Incomplete treatment)	16.2%
Recurrence	4	10.8%
Expired	2	5.4%

(h) Follow up:

Due to unsatisfactory follow up, the data regarding the disease free interval and the recurrence could not be properly evaluated. As seen in Table VIII, 26 patients ie 70.2% were disease free over a follow up period of 6 to 30 months. Six patients ie 16.2% were lost to follow up, taking incomplete treatment. Recurrence was noted in 4 patients ie 10.8%; that too after 12 months of follow up. Out of 4 patients, one expired and 3 are on salvage chemotherapy. One patient expired in the post operative period due to septicaemia.

Discussion

Mucinous tumors of the ovary are the second most common epithelial tumors. They can be further classified into benign, borderline and malignant variety. Only 5% of mucinous tumors are bilateral as compared to serous tumors which are usually bilateral. In view of difficulty in diagnosis between borderline and invasive tumors, Hart and Norris (1973), devised the following elaborate set of criteria for distinguishing these tumors. If there is obvious invasion of the stroma, the tumor is carcinoma, if there is no or only equivocal evidence of invasion, the diagnosis rests on the height of the atypical cells lining the glands, and if the atypical nuclei are three or less in stratification then the tumor is considered borderline but if four or more then tumor is considered carcinoma." Hart (1977) later added the finding of a

cribiform pattern as another criterion for invasion. Proper histology and thorough sampling of all different areas is necessary, as in one specimen there may be benign, borderline and invasive component.

Mucinous tumors occur in younger age group compared to serous tumors as shown in our study (median age 35 years). These results are comparable with the results of Chaitin et al. (1985) viz median age 48-50 years and of Hart and Norris (1973) viz median age 35 years. Mucinous tumors do occur below 20 years while serous epithelial tumors are almost never seen at this age.

The commonest symptoms was awareness of distension of abdomen as seen in 65% in the present study. This is comparable to 50% reported by Hart and Norris (1973).

Recommended surgical staging laparotomy for ovarian carcinoma requires abdominal cytology from 4-5 sites, meticulous exploration of the whole abdominal cavity, total abdominal hysterectomy, bilateral salpingo oophorectomy, infracolic omentectomy, excisional biopsy of large and suspicious lesions and selective pelvic and para aortic lymph node samplings. Apart from this, with mucinous histology, appendicetomy is also recommended as part of staging laparotomy.

Even conservative surgery like unilateral salpingo-oophorectmy can be done in young patients, having borderline variety, if child bearing function is desired. In present study 3 patients had undergone USO after frozen section confirmed that they were benign. One should be very careful and cautious while dealing with mucinous tumors of ovary because even a small leakage of mucin from the tumor can cause pseudomyxoma peritonei, a benign condition which is worse than malignancy.

Mucinous tumors acquire a large size and due to that reason they present in earlier stages compared to their serous counterparts, because of the symptoms of increase in abdominal size. In present study 15 patients ie 40.5% were in stage I & II while 7 ie 18.9% were in stage III & IV. Similar results were also observed by Chaitin et al (1985).

Mucinous tumors present with huge size; perhaps the largest of any tumor recorded in the body. Tumor size of over 40 pounds and 30 cms in greater diameter have been recorded Hoskins et al 1997. In the present study 71.7% patients had tumor size varying between 10-25cm. These results are comparable with those of Chaitin et al (1985) who reported having tumor size of 4 to 30 cm. In our study 4 patients had tumor more than 25 cms which was either benign or borderline in nature. The larger the size of tumor, the greater the chance of it being benign. In our institute a benign mucinous unilateral mammoth tumor of ovary measuring about 40 cm and weighing about 23 kgs was operated recently.

On final histopathological report 63% patients had malignant mucinous tumors, 17.4% had borderline ones and 19.5% had benign ones. One patient had all the 3 components present in one specimen. Hence thorough sampling of all areas of the tumor is necessary in mucinous tumors of ovary. Thirty three patients had seemingly unilateral tumors but on final histopathology 3 had microscopic metastasis in contralateral ovary. This stresses the need to perform bilateral salpingo-oophorectomy in epithelial ovarian tumors even though the opposite ovary looks normal macroscopically.

The commonest type of tumor usually seen with the pregnancy is dysgerminoma. But in the present study two patients with pregnancy had mucinous tumors. Both these patients had undergone restaging laparotomy and were given chemotherapy.

Conclusion:

Mucinous tumors form the second most common epithelial ovarian malignancy apart from serous tumors of ovary. They present in earlier stages compared to serous tumors. They usually present with huge size. They may occur below 20 years of age and are also known to occur in pregnant patients. Microscopic metastasis may occur in normal looking ovary and appendix hence proper staging laparotomy is essential. Thorough sampling of the whole specimen by pathologist is necessary as in one tumor there may be benign, borderline and malignant components.

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Reference

1. Chaitin A. Barabara, Gershenson M. David, and Evans L. Harry. *Cancer* 55: 1958; 1985.
2. Hart William, Norgis J. Henry, *Cancer* 31: 1035, May 1973.
3. Hart William, *Human Pathology*, 8, 541, 1977.
4. Hoskins William, Apero Coroles, Young C. Robert "Principle and Practice of Gynecologic Oncology" 2nd Edition 1997, page no. 930, Lippincott Raven Publishers, 227 East Washington Square, Philadelphia, PA 19106-3780. New York, United States of Amercia.