

Prospective Observational Study of Adnexal Masses in Adolescent Girls: Their Diagnosis and Management in a Tertiary Center

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ABSTRACT

Background: Adnexal mass means any swelling arising from the adnexa which comprises the ovary, fallopian tube, structures in broad ligaments, and other connective tissues in parametrium. Adnexal mass can be an incidental diagnosis, or it may be associated with other symptoms like pain in the abdomen. It is very commonly encountered in our clinical practice.

Materials and methods: A single-center prospective observational study involving 60 adolescent girls who came to the OPD or emergency in Lokmanya Tilak Municipal Medical College and Hospital with clinical or radiological findings s/o adnexal mass from the year 2017 to 2019 over a period of 20 months.

Results: The maximum number of adnexal masses belonged to the age-group of 14–16 years (56.7%). About 60% of patients had pain in the abdomen. While only 36.7% of patients had regular menses, and 3.3% had not attained menarche. The most common associated complaint was dysmenorrhea (20%) followed by menorrhagia (13.3%). In 86.7% of patients, no mass was palpable per abdomen, while 6.7% had a mass of 12 weeks palpable per abdomen and 6.6% had a mass of more than 12 weeks palpable per abdomen. Almost 35% of patients when followed up, showed a decrease in the size of the mass, while in 6.8% the size of the mass increased. Bilaterality was found in 10% of cases while left-sided masses (48.3%) were seen more commonly than those on the right side (41.7%). In total, 53 masses (88.3%) were non-neoplastic and 7 (11.7%) masses were neoplastic, of which 10% were dermoid and 1.7% were dysgerminoma. In our study, 8.5% of patients had ovarian torsion. Cancer Antigen 125 (CA-125) was raised in around 18.3% of patients. Out of 60 patients, 68.3% were managed conservatively out of which 3.3% underwent medical management, 28.3% underwent laparoscopy, and 3.3% patients underwent laparotomy.

Conclusion: Adnexal masses are common among adolescents, they are usually benign and often can be managed expectantly. The evaluation of adolescents with an adnexal mass should include menstrual history and a confidential inquiry regarding sexual activity. Among benign lesions, a simple cyst is the most common pathology of adnexal mass. Germ-cell tumors are the most common ovarian malignancies in children and adolescents. Management of adnexal masses in adolescents should prioritize ovarian conservation to preserve fertility.

Keywords: Adnexal masses, Adolescents, Adnexa, Ovarian mass.

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INTRODUCTION

Adnexal masses are not very common in the adolescent age-group as they are in women of the age-group of 20–40 years. Its incidence is 2.6 in 1 lakh¹ of the adolescent population. The maximum incidence of adnexal mass is at age of 14,² and the incidence increases with age. The rate of malignancy in ovarian neoplasms in adolescents and children ranges from 3.7 to 23.5%.^{3,4} Ultrasound is the most useful investigation.⁵

Differential diagnoses of adnexal masses of gynecological origin in adolescent age-group are as follows:

Ovarian: Non-neoplastic masses include simple cysts, luteal cysts, hemorrhagic cysts, endometrial cysts, and bulky ovaries like in PCOD. Benign ovarian neoplasms out of which the most common is a mature cystic teratoma. Others are cystadenomas.

Malignant ovarian neoplasm: The most common is dysgerminoma. Others such as immature teratoma, granulosa-cell tumors, and yolk sac tumors also are included.

Tubal: Hydrosalpinx, paratubal cyst, and tubo-ovarian abscess (pelvic inflammatory disease).

Uterine: Mullerian anomalies, subserosal fibroids. These are very rare.

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Acute complications of adnexal masses include torsion⁶ and rupture of cyst. These complications need to be addressed on emergency basis.

MATERIALS AND METHODS

A prospective observational study was done for 20 months in Lokmanya Tilak Municipal Medical College and Hospital. A total of 60 girls aged between 11 and 19 years were studied, who either visited the OPD or were hospitalized. Patients who were pregnant

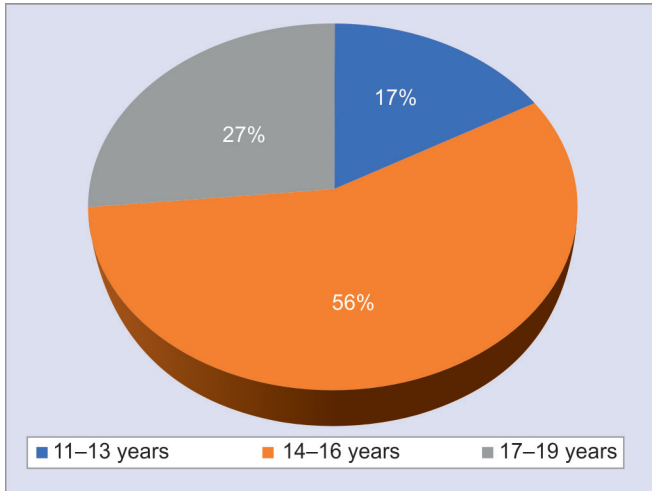


Fig. 1: Age-wise distribution among the sample population

or had a non-gynecological cause of adnexal mass were excluded. Ultrasonography was done for all patients. Tumor markers such as computed tomography (CT) scan and MRI were done for those masses that were suspected to be neoplastic on sonography.

RESULTS

The study included the age-group of 11–19 years. Breakdown of cases includes 17% between 11 and 13 years, 56% between 14 and 16 years, and 27% between 17 and 19 years (Fig. 1) Mean age was 15.28 years. In total, 2 out of 60 (3.4%) patients had not attained menarche at the time of study. About 29% subjects (48.3%) had age of menarche at 11 years, 20 (33.3%) had age of menarche at 12 years, and 8 (13.3%) had age of menarche at 10 years, while 2 (3.3%) did not attain menarche at the time of study.

Abdominal pain is the most common presentation in young women with adnexal mass.² The main complaints of the patients in the study were pain in the abdomen and menstrual irregularity. About 24 patients (40%) had come with the complaints of only pain in the abdomen, out of which 6 (10%) were having acute pain so these were hospitalized on an emergency basis. About 24 patients (40%) had menstrual irregularity. About 12 (20%) patients had pain in the abdomen as well as menstrual irregularity. While 22 patients (36.7%) had regular menses and 2 patients (3.3%) patients did not attain menarche.

The most common complaint associated with either pain in the abdomen or irregular menses was dysmenorrhea. The maximum (12 out of 60) patients had dysmenorrhea (20%) and 8 patients (13.3%) had menorrhagia. Five patients (8.3%) were not having any other symptoms while 4 patients (6.8%) had abdominal lumps. About 31 patients (51.7%) had nonspecific complaints like nausea, uneasiness during menses, etc. Patients and their guardians were asked regarding family history of Ca breast, Ca endometrium, and Ca ovary as a part of routine protocol. One patient gave a positive history of endometrial cancer in her grandmother from paternal side, who had undergone a hysterectomy for the same.

Ultrasonography is the gold standard for diagnosis because of its sensitivity and cost-effectiveness. Ultrasonography was done for all 60 patients. Nineteen patients (31.6%) had adnexal mass of size less than or equal to 3 cm including 15% who had polycystic bulky ovaries, 26 patients (43.3%) had mass of size of 3–7 cm,

Table 1: Final diagnosis of non-neoplastic adnexal masses

Diagnosis	N (%)
Simple cyst	21 (35)
Torsion of simple cyst	4 (6.8)
Para-ovarian cyst	2 (3.4)
Endometrial cyst	6 (10)
Luteal cyst	6 (10)
Hemorrhagic cyst	3 (5.1)
Tubo-ovarian mass	2 (3.4)
Polycystic ovarian morphology with bulky ovaries	9 (15)
Total	53 (88.3)

Table 2: Final diagnosis of neoplastic adnexal masses

Diagnosis	N (%)
Dermoid	5 (8.30)
Torsion of dermoid	1 (1.7)
Dysgerminoma	1 (1.7)
Total	7 (11.7)

and 15 patients (25%) had size >7 cm mass, out of which 5 patients had undergone torsion. Mean diameter was 5.725.

Six (10%) patients had mass in both ovaries, while 29 (48.3%) patients had mass in the left adnexa, and 25 patients (41.7%) had mass in the right adnexa. Seven patients (11.7%) had neoplastic etiology, while the rest had non-neoplastic etiology.

Twenty-seven patients' (45%) adnexal masses in the study were simply cystic in nature, out of which 4 (6.6%) were torsion of a simple cyst, the rest 21 (41%) were functional ovarian cysts, and 2 (3.3%) were para-ovarian cysts. While 24 cysts (40%) were complex, in which 6 (10%) were luteal cysts, 6 (10%) were dermoid, 1 (1.7%) was dysgerminoma, 3 (5%) were hemorrhagic cysts, 2 (3.3%) were tubo-ovarian mass, and 6 (10%) patients had endometriotic cysts. Nine patients (15%) had polycystic ovaries. Normal vascularity was found in maximum 54 patients (90%) of adnexal masses, while 5 patients (8.5%) had no vascularity as these were cases of torsion ovary for a single patient who had polycystic ovary (1.7%).

Final Diagnosis of 60 Patients

Tables 1 and 2 show the final diagnosis of adnexal masses in which maximum masses (24 patients) were having simple cyst (40%), out of which 4 (6.8%) had torsion. Nine patients (15%) had polycystic ovaries. Six patients (10%) had corpus luteal cyst, 6 patients (10%) had endometrioma, 3 patients (5%) had hemorrhagic cyst, and 6 patients (10%) had dermoid cyst, out of which 1 had torsion of the ovary with dermoid cyst, 2 patients (3.3%) had para-ovarian masses, 2 patients (3.3%) had tubo-ovarian masses, a single patient had (1.7%) simple cysts in both ovaries, and a single patient (1.7%) had dysgerminoma.

Computed tomography (CT) scan was done in 19 cases, including 5 cases of dermoid, except the one with torsion, 1 case of dysgerminoma, and 2 cases of tubo-ovarian mass for confirmatory purpose.

Tumor Markers

Cancer Antigen 125 was high (>35) in 18.3% (11 patients), out of which 2 (3.3%) were tubo-ovarian masses, 6 (10%) were endometriotic cysts, and 3 (5%) were dermoid. CA19-9 was elevated in 12 (20%) of case in which 6 (10%) were dermoid and 6 (10%) were endometriotic cysts (Table 3).

Table 3: Tumor markers in non-neoplastic masses

Tumor markers	Tested cases	Positive cases n (%)
CA-125	15	7 (11.9%)
CA19-9	14	6 (10.2%)
AFP	14	0
Lactate dehydrogenase	14	6 (10.2%)

Table 4: Tumor markers in neoplastic masses

Tumor markers	Tested cases	Positive cases n(%)
CA-125	7	4 (6.8%)
CA19-9	7	6 (10.2%)
AFP	7	2 (3.4%)
Lactate dehydrogenase	7	4 (6.8%)

Table 5: Mode of management of ovarian masses

Management	N (%)
Observation	39 (65%)
Medical management (AKT)	2 (3.4%)
Surgical	19 (31.6%)

Similarly alpha fetoprotein (AFP) was elevated in 2 patients (3.3%), all of which were dermoid cysts of large size. Lactate dehydrogenase (LDH) was elevated in 16.6% patients, in patients with endometriotic cysts (3.3%), tubo-ovarian mass (3.3%), dysgerminoma (1.7%), 3 cases of dermoid (5%), 1.5% of para-ovarian cysts, and 1.7% were torsion of simple ovarian cyst (Table 4).

For 41 patients (68.3%), patients' surgery was not done. According to Table 5, 39 patients (65%) underwent conservative management, including weight reduction and follow-up USG. Two patients (3.3%) who had tubo-ovarian mass underwent medical management, which included anti-Koch's medication. Surgical management was done for 19 (31.6%) patients.

Seventeen (28.3%) patients underwent laparoscopic surgery, including all dermoid cysts (10%), out of which one had intraoperative finding of torsion. All patients had dysgerminoma (1.7%), out of which 3 out of 4 (5.1%) were torsion of simple cyst, 4 out of 6 (6.8%) endometriotic cyst, 1.7% simple ovarian cyst, and 2 out of 3 (3%) hemorrhagic cysts. Two (3.3%) patients underwent laparotomy from which one case was torsion of simple cyst and other was a ruptured hemorrhagic cyst. These two cases were operated in emergency.

In adolescent age-group, ovarian conservation was prioritized in order to retain maximum fertility in future, but in cases of neoplastic masses or nonviable ovarian tissue, a decision of ovariectomy was taken. Eight patients (13.6%) underwent unilateral ovariectomy, including 1 dysgerminoma, 6 dermoid cases, and 1 large simple ovarian cyst, but underwent torsion as the ovary was not viable. Eleven patients (18.7%) underwent ovarian cystectomy, including 3 torsion of simple cyst, 4 endometriotic cyst, 3 hemorrhagic cyst, and 1 large simple cyst as given in Table 6.

All 19 patients who underwent surgery were followed with histopathology report. Six (10.2%) had dermoid, 1 (1.7%) had dysgerminoma, and 5 (8.5%) had simple cyst, out of which 4 had necrotic content, 3 (5.1%) had hemorrhagic cyst, and 4 (6.8%) had chocolate cyst.

Table 6: Mode of surgical management in sample population

Surgical management summary	N (%)
Laparoscopic cystectomy	9 (15.3%)
Laparoscopic unilateral ovariectomy	8 (13.6%)
Open cystectomy	2 (3.3%)
Open ovariectomy	0

DISCUSSION

Management of adnexal mass in adolescent girls is challenging. Most of these masses are non-neoplastic, but since many neoplastic masses like dermoid occur in this age-group, thorough workup is an essential component in its management. In modern gynecology practice, effort is directed toward conservation of fertility and to save ovaries as far as possible as opposed to aggressive management in the past.

Mean age of patients in our study was 15.28 while the range being 11–19 years. Other studies that also dealt with adnexal mass in this particular age-group are Bindia et al.,⁷ Kocak et al.,⁸ Herman's et al.,⁴ Zhang et al.,² Kavitha et al.,⁹ and Emeksiz et al.¹⁰

The most common complaints were abdominal pain (60%) and menstrual irregularity (60%) in our study. Literature also supports this conclusion as many studies have concluded abdominal pain as the presenting complaint in this age-group.^{2,4,7–9}

The most common cysts that are common in this age-group are simple cyst, the reason behind which is the hormonal imbalance caused by immature hypothalamo–hypophysial axis. In our study, 36 (60%) patients had this imbalance resulting in 27 (45%) having simple cysts and 9 (15%) having bulky ovaries due to polycystic morphology.

Tumor markers were done for all suspected neoplastic masses in our study. Since CA-125 has high sensitivity and less specificity,⁹ its use in adolescent neoplasms are very limited. Therefore, other tumor markers like AFP, CA19-9, and LDH were also done. Normal range of CA-125 was considered till 35. A study done by Kavitha et al.⁹ shows that CA-125 values were high in tubo-ovarian mass due to tuberculosis. In our study too, we had the same result. Serum CA-125 can be elevated in various other conditions, including endometriosis,¹¹ pelvic inflammatory disease, tuberculous peritonitis, liver cirrhosis, chronic renal failure, pleural effusion, and pancreas or colorectal cancer, as well as in postoperative status.⁹

Cancer Antigen 125 plays a significant role in identifying malignant tumors, and their normal value is an indication that the tumors are benign. Lactate dehydrogenase also is nonspecific but a sensitive marker. It is elevated in dysgerminoma. Alpha fetoprotein raises the suspicion of germ-cell tumors like immature teratoma and embryonal cell tumors.

Ultrasound is the gold standard imaging to diagnose adnexal mass. The chances of malignancy in ovarian neoplasm on USG are calculated with International Ovarian Tumour Analysis (IOTA) group. In cases of neoplasms, CT and MRI assist the clinician preoperatively in anticipating the malignant potential of neoplasm.¹²

Seven patients (11.7%) had neoplastic etiology, while the rest had non-neoplastic etiology, out of which 10% were dermoid which were most common neoplastic masses in this age-group. These results were similar to studies done in the past.^{2,7,9}

Since most of the adnexal masses were non-neoplastic, they were managed expectantly like other studies,¹³ 2 cases with tubo-ovarian mass were managed with AKT. A total of 19 patients (31.6%)

underwent surgical management. The primary mode of surgery was laparoscopy like the other studies.^{2,8,9,14}

The primary aim in this age-group is fertility conservation.¹⁵ Therefore, only neoplastic masses underwent ovariectomy, and one patient with severe torsion where the ovary was not viable and the cystectomy (18.6%) was preferred over oophorectomy (13.6%). The rest of the other torsions were also managed by ovarian cystectomy and ovarian tissue was preserved like in some studies.⁹

CONCLUSION

Most of the adnexal masses in this age-group are non-neoplastic. The imaging modality ideally suited is ultrasonography, and to assist the diagnosis, tumor markers are done wherever ultrasound shows suspected neoplastic mass. Surgeries should be fertility preserving and for which laparoscopy is the preferred mode of surgery.

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