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Categorization of Ovarian Dermoids Depending Upon Their Sonographic Appearances

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Abstract: *Germ cell tumors account for nearly 15-20% of all ovarian neoplasms with cystic teratomas being the most common (approximately 95%)[1]. Dermoids are relatively soft masses and are frequently either missed or underestimated in size as they may be difficult to palpate on physical examination. The gross pathological changes are extremely variable, inconsistent and unpredictable since dermoids are composed of tissue elements derived from all three layers with varying degrees of differentiation. Depending on the extent and admixture of their epithelial elements, the ultrasound patterns can vary as this markedly variable internal composition is responsible for their wide spectrum of ultrasound findings[2]. A thorough analysis of all ultrasound features that characterize dermoid cysts can lead in the vast majority of the cases to an exact diagnosis. The purpose of this paper is to characterize and categorize the sonographic findings of the ovarian dermoid cysts.*
Objective: *Categorization of ovarian dermoids depending upon their sonographic appearances.*
Material andMethods: *Twenty-five female patients with ovarian dermoids ranging in age from 21 to 40 years (Refer Chart 1) were evaluated with a 3.5 MHz convex transducer, in the department of Radiodiagnosis of Navodaya Medical College and Hospital, Raichur.*
Results: *Ovarian dermoids presented a wide and varied spectrum of sonographic appearances, depending upon their internal composition. According to their sonographic morphology, the ovarian dermoids were classified under four broad groups: Group I – Purely Cystic lesions, Group II – Complex lesions-predominantly cystic, Group III – Lesions with hair/fluid level, and Group IV – Predominantly solid lesions.*
Conclusion: *Ovarian dermoidscan be classified according to their morphology on sonography.*
Key Words: *ultrasound, ovarian dermoid*

I. Introduction

The dermoid cyst or the mature cystic teratoma represents the most frequently encountered, the most often operated and the most known ovarian neoplasm. Dermoids have a wide age distribution and may be encountered from infancy to old age; however, they occur most commonly in reproductive age group[1]. Dermoids are relatively soft masses and are frequently either missed or underestimated in size as they may be difficult to palpate on physical examination. The gross pathological changes are extremely variable, inconsistent and unpredictable since dermoids are composed of tissue elements derived from all three layers with varying degrees of differentiation. Depending on the extent and admixture of their epithelial elements, the ultrasound patterns can vary as this markedly variable internal composition is responsible for their wide spectrum of ultrasound findings.

II. Material And Methods

Twenty-five female patients with ovarian dermoids ranging in age from 21 to 40 years (Refer Chart 1) were evaluated with a 3.5 MHz convex transducer, in the department of Radiodiagnosis of Navodaya Medical College and Hospital, Raichur. Multiple sections of both ovaries were obtained in all the patients. Of the twenty-five patients diagnosed with ovarian dermoids on ultrasound, twelve patients were asymptomatic at presentation, six complained of generalized lower abdominal pain, four presented with the complaint of abdominal mass, two of abnormal uterine bleeding, and one with dull lower backache (Refer Chart 2).

III. Results

A total of 25 ovarian dermoid cysts were diagnosed in 25 patients- all the cases were unilateral. Fourteen masses were in the right adnexa and seven in the left. Three were predominantly retrouterine, and one was found anterior to the uterus and inferior to the well-distended urinary bladder (Refer Chart 3).

A varied spectrum of sonographic appearances of ovarian dermoid cysts was found. According to their internal composition and sonographic morphology, the ovarian dermoids were classified into four broad groups (Refer Chart 4):

Group I – Purely Cystic lesions (Figures 1a & 1b)

Two patients had a mass which was completely anechoic with posterior acoustic enhancement. The masses were round-to-oval in shape, well-defined and slightly irregular in outline.

Group II – Complex lesions-predominantly cystic

This group was the most common category of ovarian dermoids, comprising of fourteen masses. This group was subdivided into three subgroups:

IIA: Complex cystic mass with internal solid components.

This group comprised of 7 masses. Out of these 7 masses, 5 showed a well-defined posterior acoustic shadowing. Out of these 5 lesions with posterior shadowing, 2 showed a "Tip of Iceberg" appearance(Figure 2).

IIB: Complex cystic mass with solid mural nodule. (The Dermoid Plug)

Four masses were categorized in this group. Three of the four masses showed a predominantly hyperechoic nodule and one had a completely hyperechoic nodule(Figure 3 & 4).

IIC: Cystic mass with multiple linear hyperechogenic interfaces ("Dermoid Mesh").

Three dermoid cysts were grouped under this category. The masses had solid internal components associated with well-defined posterior acoustic shadowing(Figures 5a &5b).

Group III– Lesions with hair/fluid level(Figures 6a, 6b & 6c)

This group comprised of 5 masses.

Group IV – Predominantly solid lesions(Figures 7a & 7b).

Four lesions showed intense aggregation of hyperechoic internal echoes giving the masses a solid or predominantly solid appearance. Out of the four masses classified in this category, one showed the presence of two hyperechoic spheres of aggregated echoes within it.

IV. Discussion

Ovarian dermoid cysts or mature cystic teratoma present with various complex sonographic aspects. That is why the ultrasonographic diagnosis may be difficult. Yet, a thorough analysis of all ultrasound features that characterize dermoid cysts can lead to the exact diagnosis in a vast majority of the cases. The appearance of ovarian dermoid cysts on sonography is highly variable, ranging from a predominantly solid mass to a predominantly cystic lesion[3]. The sonographic features of ovarian dermoids depend upon their internal composition and the degree of differentiation of the individual constituents.

Group I – Purely Cystic lesions: (Figures 1a & 1b)

Pure sebum in dermoid cysts appears anechoic on ultrasound. This cystic morphology is possibly due to the homogenous constitution of sebum without any internal acoustic interfaces[4]. About 10-15 % of the dermoid cysts are anechoic or show a predominantly cystic pattern and cannot be easily differentiated from other cystic masses[5].

Group II – Complex lesions-predominantly cystic: Whensolid components like teeth, bones orcalcifications arepresent, the dermoid cysts show areas of hyperechogenicity, with well-defined posterior acousticshadowing. The acoustic shadow seen distal to a tuft of hair-ball is ill-defined, heterogeneous andhazy.

An echogenicmass on the top of sebum/fluid or a completely echogenic mass containing hair results in a posteriorshadow distal to the echogenic mass within the dermoid, obscuring most of themass except the anterior wall. This isreferred to as the "Tip of Iceberg" sign[6].The acoustic shadowing given by the hyperechogenic structures inside the cyst may be diffuse if it involves the whole cyst or it may be limited to a part of the cyst(Figure 2).

The dermoid plug (Rokitanski nodule) is probably the most characteristic aspect of the dermoid cysts[7]. It is an outgrowth from the inner surface of a dermoid cyst. More than one Rokitanski nodules may also be seen within the same mass. The dermoid plug may contain some solid material like bones, teeth or hairs which may extend into the cyst's cavity. Extracutaneous elements are often present within this echogenic mural soft tissue nodule, which makes the mass truly trigerminal[8]. The sonographic is that of a hyperechoic nodular structure, usually with distal acoustic shadow, situated near the cyst wall(Figure 3 & 4).

Hair fibers may also be seen as multiple fine hyperechoiclinear interfaces floating within the dermoid cysts. This appearance is also considered specific for dermoidsand has been referred to as the "Dermoid Mesh" sign[9]**.** The ultrasonographic appearance is that of long linear or dot-like hyperechoic echoes within the mass(Figures 5a & 5b).

Group III – Lesions with hair/fluid level: Fat-fluid levels(Figure 6a) and fat-hair levels (Figure 6b)are seen quite frequently in dermoid cysts and are considered less specific signs. Sometimes sedimentation of the serous

components may occur within the dermoid cyst producing an ultrasound visible interface that changes on moving the patient[10]. Occasionally, the echogenic fat may be seen floating on top of the anechoic layer of fluid due to its inherent low density[11](Figure 6c).

Group IV – Predominantly solid lesions: A uniform mixture of fat and sebum may give the dermoid cysts a dense solid appearance. The intensity of echoes from within the dermoid is directly proportional to the quantity of fat in it[4]**.** Occasionally, the fat within the dermoid cysts may conglomerate which is seen as one or more hyperechoic spheres occupying the entire cystic cavity(Figures 7a & 7b).

This wide spectrum of sonographic appearances of ovarian dermoids is seen because dermoids are composed of tissue elements derived from all three layers with varying degrees of maturity, differentiation, and quantity. Depending upon the extent and admixture of their epithelial elements, the sonographic morphology of ovarian dermoid cysts varies which can be classified under specific categories.

References

[1]. Kurman RJ. Blaustein's Pathology of the female genital tract, 4thedn. New York, Springer-Verlag. 1994.
[2]. Sandler MA, Silver TM, Karo JJ. Grey-scale ultrasonic features of ovarian teratomas. Radiology 1979;131:705-9.
[3]. Moyle JW, Rochester D, Siler L et al. Sonography of ovarian tumors; predictability of tumor type. AJR 1983;141:985-91.
[4]. Sheth S, Fishman EK, Burke JL et al. Variable sonographic appearances of ovarian teratomas : Correlation with CT. AJR1988;151:331-4
[5]. Mais V, Guerriero S, Ajossa S, et al, Transvaginal sonography in the diagnosis of cystic teratoma. ObstetGynecol 1995;85:48-52.
[6]. Guttgman PH. In search of the elusive benign cystic ovarian teratomas-application of ultrasound "tip of the iceberg" sign. J ClinUltrasound 1977;5:403-6.
[7]. Anderson WAD, Kissane JM. Pathology 7th ed. St. Louis. Mosby. 1977:1745-7.
[8]. Ganeshan S, Indrajit IK. Sonographic spectrum in ovarian dermoids : A pictorial essay. Ind J RadiolImag 1996;6:33-6.
[9]. Malde HM, Kedar RP, Chadha D et al. Dermoid mesh: a sonographic sign of ovarian teratoma (Letter). AJR 1992; 159:1349-50.
[10]. Fleischer AC, Entman SS. Sonography evaluation of pelvic masses with transabdominal and/or transvaginal sonography.In: Fleischer AC, Manning FA, Jeanty P, Romero R(eds) Sonography in obstetrics and gynaecology. Principles and practice. McGraw-Hill, 6th edition 2001:883-911.
[11]. Hutton L. Rankin R. The fat-fluid level – Another feature of dermoid tumors of the ovary. J Clin Ultrasound 1979;7:215-8.

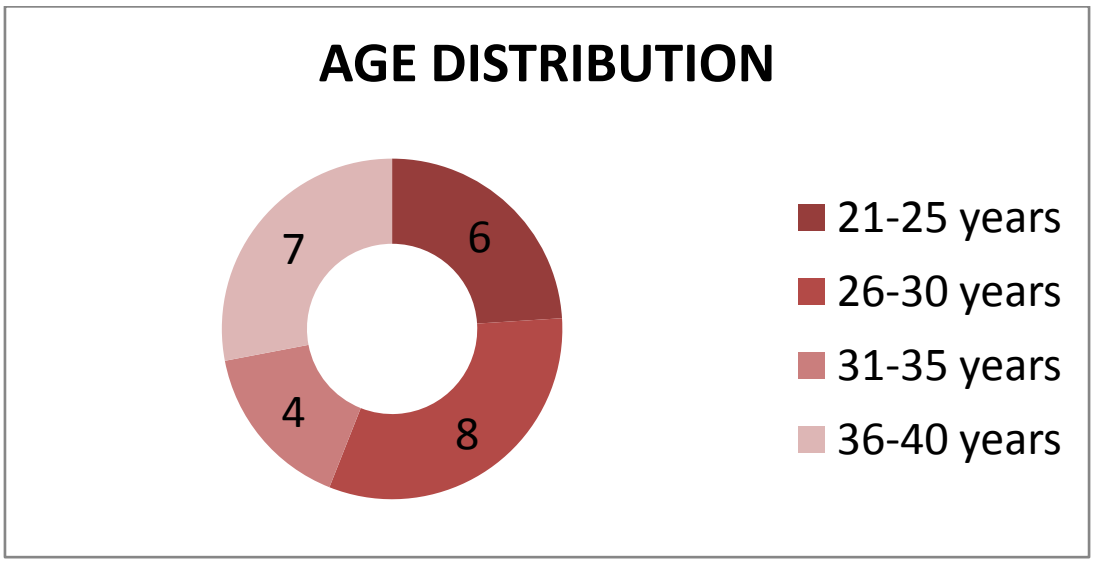

Chart 1: AGE DISTRIBUTION OF PATIENTS

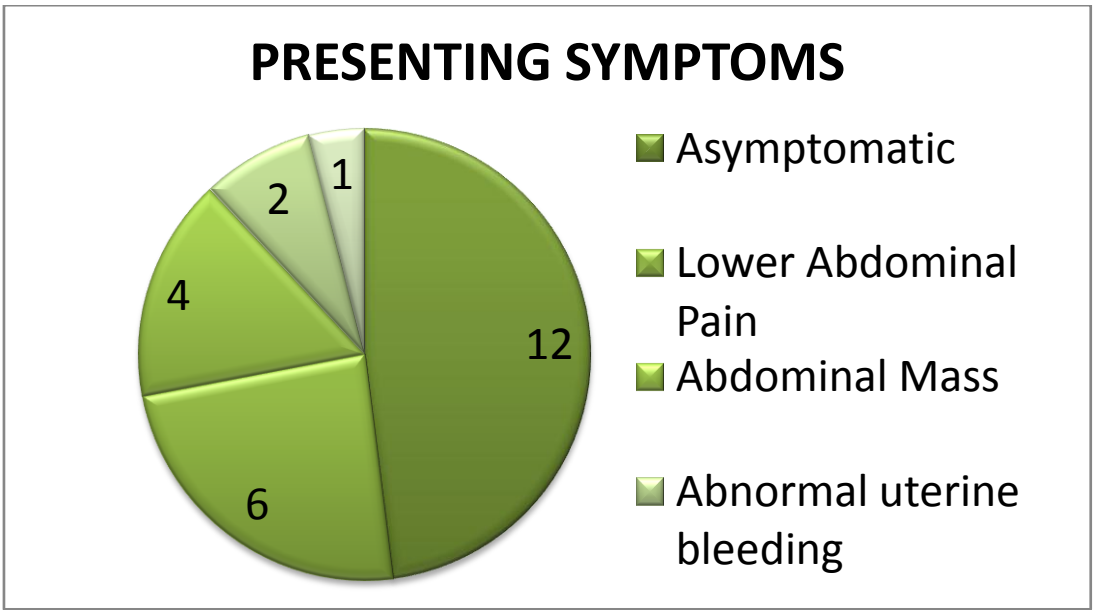

Chart 2: PRESENTING SYMPTOMS OF PATIENTS

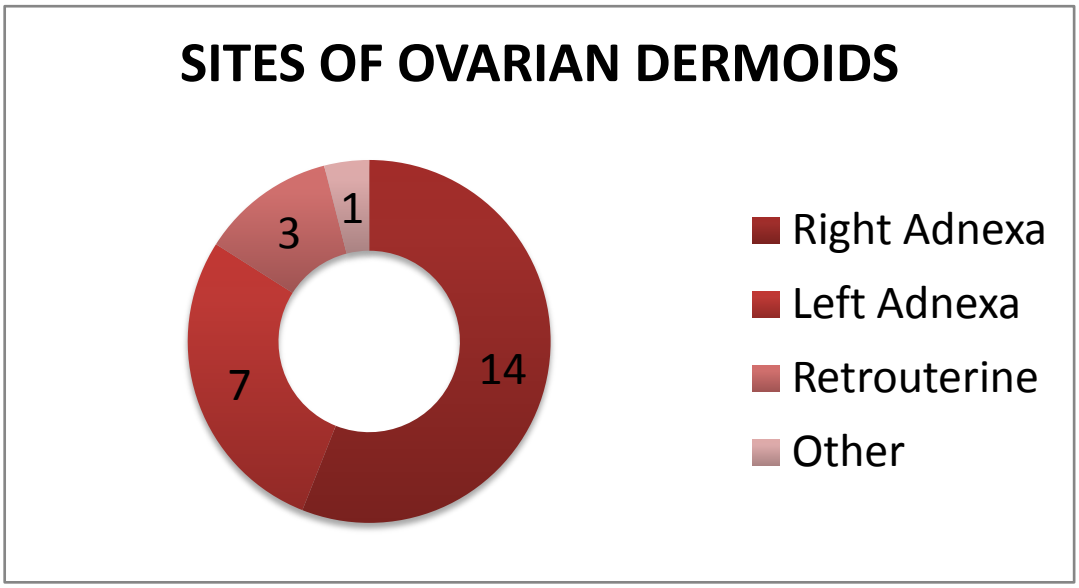

Chart 3: SITES OF OVARIAN DERMOIDS

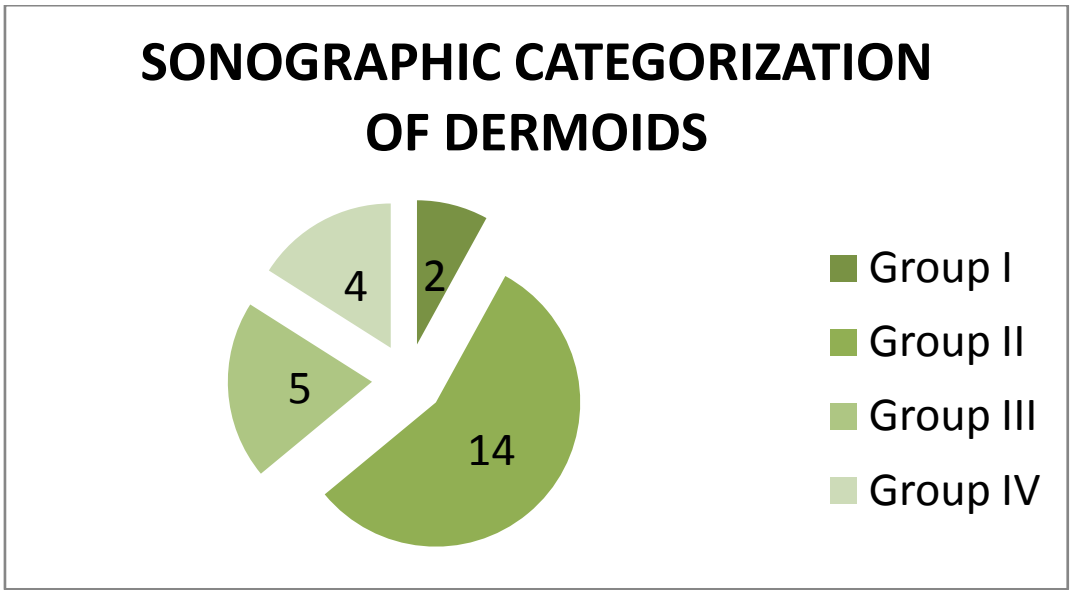

Chart 4: SONOGRAPHIC CATEGORIZATION OF DERMOIDS

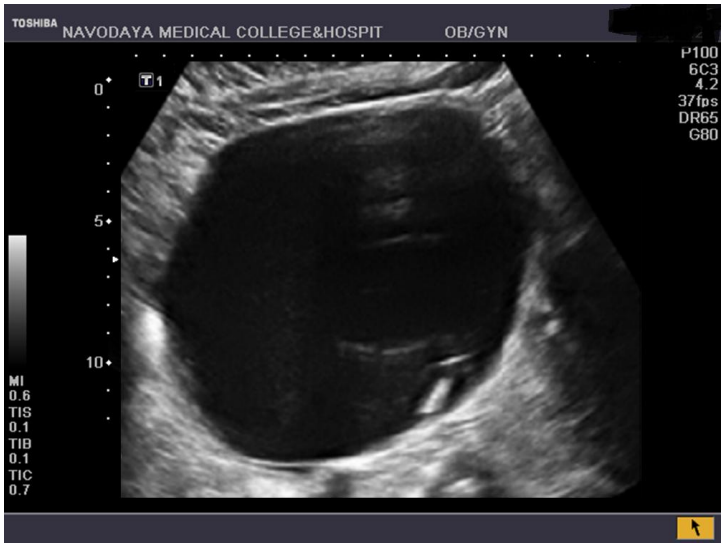

Figure 1a: Group I - Purely Cystic lesions

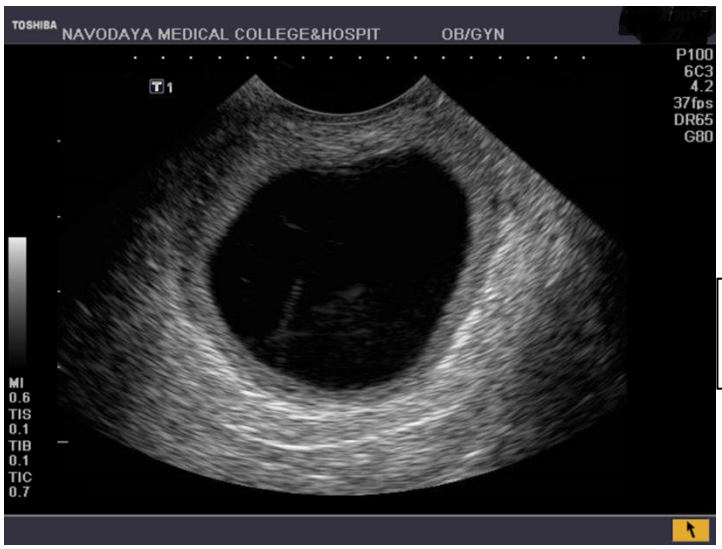

Figure 1b: Group I - Purely Cystic lesions

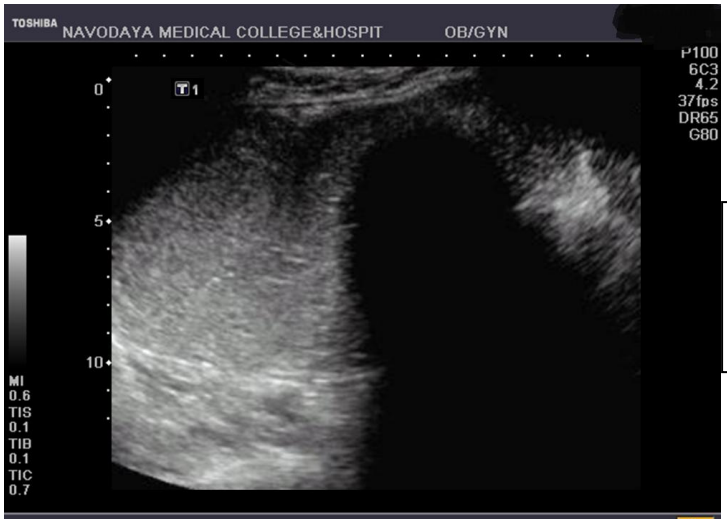

Figure 2: Group IIA - Complex cystic mass with internal solid components. (Tip of Iceberg)

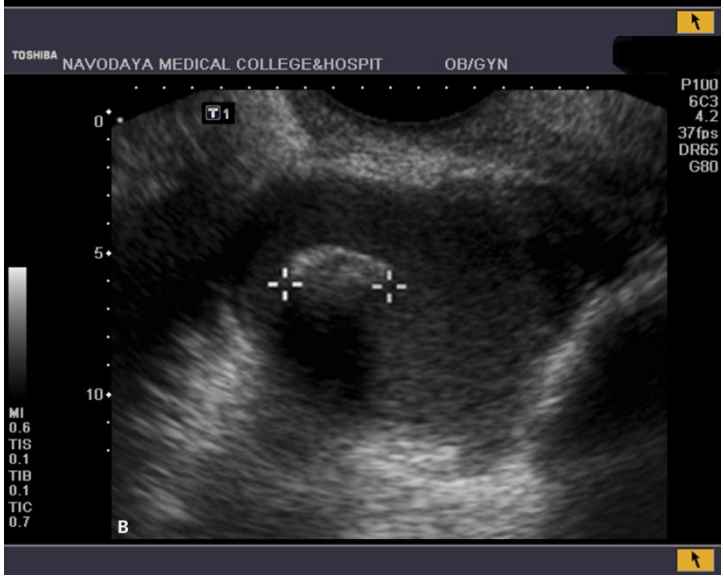

Figure 3: Group IIA - Diffuse or partially echogenic mass with posterior shadowing due to sebaceous material and hair within the cyst cavity.

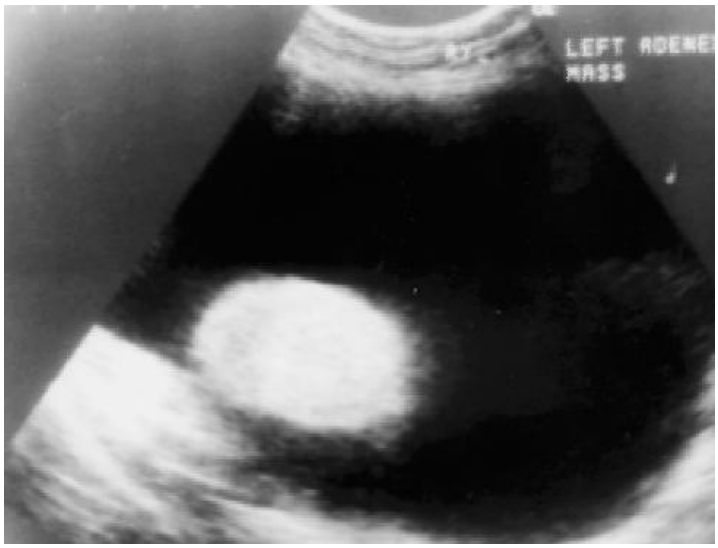

Figure 4: Group IIB - Complex cystic mass with solid mural nodule. (The Dermoid Plug)

Figure 5a: Group IIC -Cystic mass with multiple linear hyperechogenic interfaces ("Dermoid Mesh").

Figure 5b: Group IIC -Dermoid Mesh Sign: internal solid components with posterior shadowing

Figure 6a: Group III – Lesions with fluid-fluid level

Figure 6b: Group III – Lesions with hair fluid level

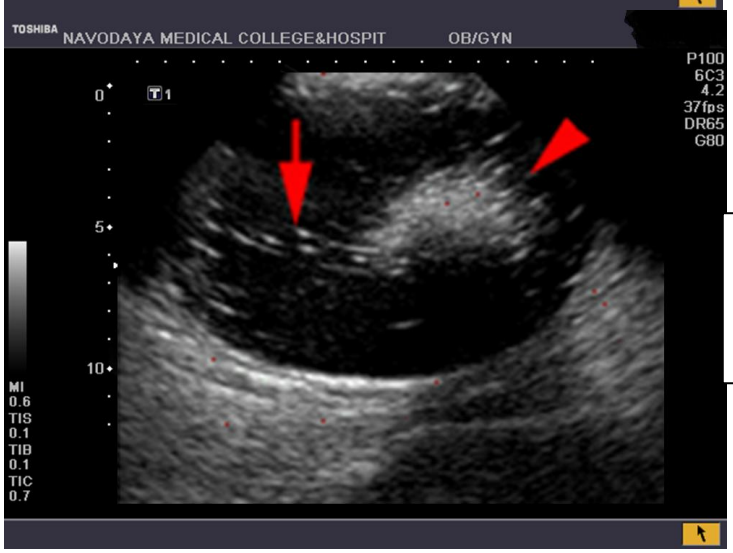

Figure 6c: Group III – Multiple thin, echogenic bands caused by hair in the cyst cavity: the dot-dash pattern.

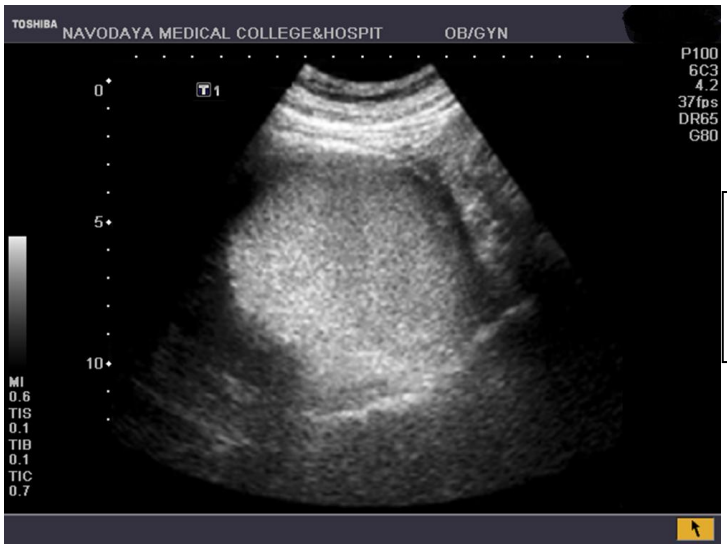

Figure 7a: Group IV – Predominantly solid lesions.

Figure 7b: Group IV – Predominantly solid lesions.