The Complexity of a “Complex Mass” and the Simplicity of a “Simple Cyst”

Ilan E. Timor-Tritsch, MD
Steven R. Goldstein, MD
New York University School of Medicine
New York, New York USA

Gynecologic sonography has made considerable strides in the last 20 years. Initially, the resolution of abdominal transducers increased. Then transvaginal probes were introduced, were perfected, and have become the principal tools for evaluating the female pelvis. Correlations of sonographic images with pathologic findings have led to a substantial understanding of adnexal abnormalities. In fact, you could say, the field collectively has a learning curve just as individuals have a learning curve. The development of scoring systems to characterize and define ovarian lesions first based on morphologic characteristic and later including color Doppler flow data brought us closer to a relatively reliable distinction between benign and malignant lesions or at least a negative predictive value in the range of 97% to 99%.1–3

Despite the above achievements, it is disheartening to see today some gynecologic sonographic reports that may have been appropriate 20 years ago when resolution was more limited, as was our field’s level of understanding.

We frequently see, in reports of a gynecologic patient, the wording “a left adnexal complex mass measuring $4 \times 5 \times 4$ cm was seen.” We desperately look for a more detailed description of the finding—in vain, because there is none. Then we search for the results of a Doppler study of the vessels in or around the finding. Again, none are reported. The most alarming message comes at the end of the report in the paragraph entitled “Impression,” where we see a long list of differential diagnoses, which invariably end with the statement, “. . . ovarian malignancy cannot be ruled out.” Looking at the pictures on which these reports are issued, we can often see benign-appearing adnexal lesions such as corpora lutea, cystic teratomas, endometriomas, and even simple cysts. Much of the time, however, the diagnosis can be made with a great deal more accuracy than the clinician is currently getting. We agree that not all hemorrhagic corpora lutea, endometriomas, or benign cystic teratomas are “classic” in their sonographic appearance, but most of them are distinctive enough. Therefore, this practice of giving a differential diagnosis that includes virtually every adnexal abnormality is no longer appropriate. As a field we can do better—most of the time.

What should the referring provider do reading such a report? When the adnexal mass was detected at the palpatory examination, the gynecologist knew all too well the differential diagnoses pertaining to this mass, including the possibility of cancer. The patient was sent for the sonographic scan for help in the diagnostic process, not for the purpose of reading the list of diagnoses the gynecologist knew in the first place. Imaging laboratories can and should do better much of the time.
We believe that even the word complex is an unfortunate choice. Without a detailed description of the sonographic components, that is, its sonographic characterization, the word complex is totally meaningless. We cannot fault entirely the sonologists and sonographers for the indiscriminant and potentially harmful selection of the words complex mass. The literature is replete with these words. Some make the distinction of simple and nonsimple (complex) lesions. However, lumped together in the complex group are benign masses (endometriomas, cystic teratomas, corpora lutea, and benign cysts) and others as well as malignancies of the ovaries.

The cluster of anatomic or pathologic building blocks of the lesions duly described in the body of the report could help render clinical meaning to the word complex coming closer to the clinical diagnosis. If properly described, the obscure “complex mass” will often become one of the following:

1. A corpus luteum (and not a cyst!) by description of meshlike or low-level echogenic content, at times a linear interphase between anechoic and low-level echoic fluid in a patient in the secretory phase of the cycle. It represents some bleeding into the follicle that has ovulated. If viewed with color flow Doppler sonography, it shows a typical “ring of fire.” If it enlarges because of a more than usual amount of blood, it will be known as a hemorrhagic corpus luteum, but the physiologic features are the same regardless of size.

2. A benign-appearing cystadenoma, featuring multilocular, mostly anechoic (serous?) or low-level echoic (mucinous?) content with thin walls and thin septations, usually emanating from a laterally placed point of origin, with a paucity of blood vessels. Vessels that are present have uniform calibers.

3. A cystic teratoma, with its usually typical punctate, low-level echoic fluid (sebum and hair) and often hyperechoic, shadowing central component with a typical lack of vascularity.

4. An endometrioma, with its typical homogeneous “ground glass–like” inner content, with no evidence of blood flow within and with variable wall thickness.

5. A truly malignant-appearing mass, based on mixed echogenicity, several papillary protrusions of more than 2 to 3 mm containing visible blood vessels, and at times larger areas of solid components with bizarre, irregular vessels with changing calibers and occasional vascular “lakes.”

More examples could be given, but these sufficiently illustrate the issue. All the above-mentioned sonographic findings, if placed in the context of the day of the menstrual cycle (in women of reproductive age) or indicating whether the patient is postmenopausal, will help better define the pathologic nature than simply using the empty words complex mass. With application of some of the published knowledge to the individual cases, an acceptable level of accuracy can be achieved in labeling the lesions. Moreover, a well-trained and “well-read” sonologist will be able to rely on subjective evaluation. Subjective evaluation of ovarian masses based on pattern recognition can achieve sensitivity of 88% to 100% and specificity of 62% to 96%. Such subjective evaluation was found to be superior to scoring systems and mathematical models. Ultimately, however, it is a learned skill based on prior validation of and feedback from the pathologist to the imaging specialist.

Reporting a so-called complex mass without placing it in the context of time and relating it to the last menstrual period and without properly describing its sonographic characteristics presents a potential threat to the patient.
by the casual and often inappropriate insertion of the words “malignancy cannot be ruled out.” It is all too well understood that this sentence is frequently attached for obvious legal reasons, even though the sonologist may have doubts about the realistic (and rare) probability of malignancy but simply does not want to take any chances.

Furthermore, many ultrasound laboratories do not use color or power Doppler sonography to fine tune the diagnosis. We are aware of the controversies surrounding the clinical value of flow velocity and resistance-to-flow measurements to predict or to rule out malignant ovarian lesions. However, there are several instances in which using “color as morphology” and understanding its meaning can support a diagnosis or rule out the structure as benign (eg, the lack of color signals in benign cystic teratomas, simple cysts, or endometriomas) or as physiologic (with the characteristic ring of fire of a corpus luteum). If a large number of erratic vessels with changing calibers, unusual anastomoses, and vascular lakes are seen entering an adnexal structure with centrally located flow within the mass, regardless of the resistive indices, it can be considered as highly suggestive of malignancy. The same can be said about the detection of blood vessels in papillae. If the papillary protrusions show blood flow and are 3 mm or larger, and if many are seen, this should also raise the possibility of malignancy.

In short, the term complex mass should not be used if a clear diagnosis can substitute for it. If this term is used despite its dubious meaning (some imaging specialists cannot part from the term), it is perfectly acceptable to follow it with a clear and detailed description and sonographic characterization of the lesion so called. This will enable the referring provider to consider several options to treat the patient.

Before we get off our soapbox, let us turn to the loose use of the term cyst. The word cyst found in the dictionary means “an abnormal sac containing gas, fluid, or a semisolid material, with a membranous lining.” However, in the minds of most obstetricians and gynecologists, it rightfully denotes disease. The same is true for the patients. If a follicle or a corpus luteum is called a cyst (and these are the 2 most common examples for this misnomer), the patient will remember this diagnosis and in the future will continue to refer to it as a pathologic finding, misleading herself and every subsequent physician taking her gynecologic history. Follicles are normal physiologic structures in the ovary during the reproductive years. They should be called follicles, not follicular cysts and not ovarian cysts, but simply follicles. They can be easily and concisely be differentiated from structures other than physiologic components of the ovary. When they are large, the nomenclature unruptured follicles may become appropriate.

The same is true for the term corpus luteum cyst. After the day in the cycle of the patient is ascertained and the structure is described in terms of its content, wall structure, and their typical peripheral, circular blood flow pattern, they should be called simply corpora lutea or hemorrhagic corpora lutea, avoiding the extra (and unnecessary) word cyst. If the corpus luteum exceeds 4 to 5 cm, there is some justification to describe it as a cyst. In this case, the term hemorrhagic corpus luteum cyst may be used. As a general rule, when possible, women in the reproductive years should be scheduled for evaluation of the ovaries (as well as the endometrium) immediately after the menstrual flow ends roughly on days 5 to 9 of their cycle, well before ovulation occurs.

Furthermore, up to 15% of postmenopausal women will show simple cystic adnexal structures up to 5 cm. Those studies with surgical intervention consistently show them to be benign, with approximately two thirds of them being serous cystomas. Unlike the breast, cervix, and endometrium, where we constantly try to find premalignant lesions before they “cross the line” into malignancy, it appears that benign cystic postmenopausal ovarian structures do not become malignant, and that is why they can be followed conservatively.

We do not mean to sound overly critical. Some sonographers and sonologists already image and report the way we think is appropriate. We simply want those who still report the way they did years ago to follow the field’s learning curve. Wording of reports has far-reaching consequences. Ultimately, change will come about by the way we teach residents, give lectures at postgraduate courses, and write articles and textbooks. The problem sounds complex, but the solution is simple.
References


