2021

Adnexal mass

Reproductive ages & Pregnancy

Leila Mousavi,
isfahan university of medical science

History?

Marker?

Pregnancy?

Age?

Size?

Sonography?

MRI?

- Adnexal masses stimulated by reproductive hormones are found almost exclusively in this age group.
- These include **physiologic cysts, endometriomas, and leiomyomas**.
- Ovarian or tubal malignant neoplasms are uncommon in this age group, although the peak age for ovarian germ cell tumors is between ages 10 and 30 years.

R/O malignancy:

- The **most important factor** used to determine the clinical suspicion of malignancy of an adnexal mass is the appearance of the mass on imaging;
    - transvaginal ultrasound is the preferred study.

- **High risk** –
- Features of malignancy (ie, solid, nodular, thick septations)
- If imaging be suggestive of metastatic disease (include: ascites or evidence of metastatic disease (eg, peritoneal masses, enlarged lymph nodes) are present, even in the absence of malignant features in the mass itself,

- **Intermediate risk** –
- Not anechoic and/or unilocular, but no features of malignancy (eg, a mass with thin septations or low level echoes).

- **Low risk** –
- Anechoic unilocular fluid filled cysts with thin walls.

Risk category:

- In high risk group:
  - **surgical exploration is required.**
-
- For **most** premenopausal patients with a mass with an **intermediate- or low-risk** appearance:

suggest surveillance rather than surgery.

- The exceptions are very elevated serum CA 125 **Or**
those in whom a germ cell or sex cord-stromal tumor is suspected

Surveillance method:

- **Intermediate-risk masses** –

transvaginal ultrasound in six weeks.
then repeat an ultrasound in three months and then six more months.
then do a final ultrasound one year later.

- **Low-risk masses** –

repeat an ultrasound in three months
then six more Months

We do not routinely follow with CA 125 in premenopausal patients. If an initial level was drawn and was very elevated, we proceed with surgery. If the initial level was <35 U/mL, we do not repeat it. If it was moderately elevated (35 to <200 U/mL), we draw it with each ultrasound until a pattern emerges. If it is consistently low or moderately elevated, we discontinue CA 125 testing.

During surveillance…

1. Physiologic cysts typically resolve on follow-up: discontinue surveillance

2. Non-physiologic non-neoplastic benign simple cysts usually remain unchanged: surveillance continues

3. neoplastic simple cysts:

- **increases in size to ≥10 cm**,
- **develops features of malignancy**,
- or the CA 125 increases to >35 U/mL

: proceed with **surgery**

Surgical method:

ovarian cystectomy is reasonable if :

1. the preoperative suspicion of malignancy is **low**,
2. the mass appears benign intraoperatively,
3. and there is no evidence of metastatic disease.

Every safeguard against intraoperative rupture of the mass should be taken.

Table 1. Classification of adnexal masses in pregnancy (Graham 2007; American College of Obstetricians and Gynecologists' Committee on Practice Bulletins – Gynecology 2016; Alalade and Maraj 2017).

Ovarian, benign	Ovarian, malignant
• Follicular cysts • Corpus luteal cysts • Haemorrhagic cysts • Mature cystic teratoma (dermoid) • Serous cystadenomas • Mucinous cystadenomas • Endometriomas (chocolate cyst)	• Epithelial • Germ cell • Sex cord stromal • Metastatic • Pseudomyxoma peritonei
Non-ovarian, gynaecological	**Non-ovarian, non-gynaecological**
• Paraovarian cyst • Paratubal cyst • Leiomyoma • Hydrosalpinx • Tubo-ovarian abscess • Peritoneal inclusion cyst/pseudocyst • Fallopian tube malignancy	• Diverticular abscess • Appendiceal abscess or mucocele • Pelvic kidney • Bladder or ureteral diverticulum • Gastrointestinal cancer • Retroperitoneal sarcomas • Lymphoma • Metastatic cancer (e.g. breast)
Unique to pregnancy	
• Ectopic or heterotopic pregnancy • Theca lutein cyst and hyperreactio luteinalis • Hyperstimulated ovaries • Luteoma	

Management of ovarian masses in pregnancy: patient selection for interventional treatment

Antonia Carla Testa, Floriana Mascilini, Lorena Quagliozzi, Francesca Moro, Giulia Bolomini, Maria Teresa Mirandola, Maria Cristina Moruzzi, Giovanni Scambia, Anna Fagotti

Martone *et al. Gynecological Surgery* (2021) 18:3
https://doi.org/10.1186/s10397-021-01084-9

Gynecological Surgery

REVIEW ARTICLE Open Access

Adnexal masses during pregnancy: management for a better approach

Simona Martone, Libera Troìa and Stefano Luisi*

The Journal of Obstetrics and Gynaecology

Journal of Obstetrics and Gynaecology

ISSN: 0144-3615 (Print) 1364-6893 (Online) Journal homepage: https://www.tandfonline.com/loi/ijog20

Ovarian cysts in pregnancy: a narrative review

Sachintha Senarath, Alex Ades & Pavitra Nanayakkara

1. The incidence of adnexal masses complicating pregnancy varies from 0.05 to 2.4 percent, and **approximately 1 to 6 percent of these masses are malignant**

- representing the fifth most common cancer diagnosed during pregnancy:
- breast, thyroid, cervical cancer, and Hodgkin lymphoma

- higher rate of torsion in adnexal masses between 6 and 8 cm in diameter and between the 10th and 17th week of gestation

Benign:

1. Among the simple masses, 1 percent were malignant
2. whereas in the complex masses, 9 percent were malignant.

- Benign masses **without** complex features on ultrasound are generally physiologic/functional cysts (eg, follicular cysts), but may be unilocular serous or mucinous cystadenoma or hydrosalpinx.

- Benign masses **with** complex features on ultrasound include corpus luteum, mature teratomas, hydrosalpinx with septation, theca lutein cysts, endometriomas, multilocular cystadenomas, as well as extrauterine pregnancies….

Three benign lesion:

- The **corpus luteum** persists longer during pregnancy and thus is likely to reach a larger size and may become hemorrhagic, rupture, or undergo torsion.
- **Theca lutein cyst** developed due to hypersensitivity to hCG. Bilateral multiseptated cystic adnexal masses in a patient with gestational trophoblastic disease, multiplegestation, ovulation induction, or a pregnancy complicated by fetal hydrops.
- **A luteoma** is an uncommon solid benign lesion specific to pregnancy. It is a nonneoplastic ovarian change associated with pregnancy that can simulate a neoplasm on clinical, gross, or microscopic examination. The diagnosis should be suspected when a solid adnexal mass is associated with maternal hirsutism or virilization.

malignant:

1. Among the simple masses, 1 percent were malignant
2. whereas in the complex masses, 9 percent were malignant.

Malignant neoplasms

- **Epithelial ovarian tumors** comprise approximately one-half of all ovarian malignancies in pregnant patients, then germ cell , and stromal tumors and a variety of other tumor types
- Approximately 50 percent of epithelial ovarian tumors detected in pregnancy are of **low malignant potential (formerly called "borderline"),** and the other 50 percent are invasive.

- Approximately three-fourths of malignant ovarian germ cell tumors in pregnancy are **dysgerminomas**;
- **Dysgerminomas** are bilateral in 10 to 15 percent, lymphatic spread to pelvic or para-aortic nodes occurs

- Among hystotypes that persist beyond the second half of pregnancy, mature cyst teratoma is the most common diagnosis, along with serous and mucinous cystoadenomas and endometriomas

- Among malignancies, germ cell tumors, stromal tumors, and borderline tumors are the most common ovarian malignancy during pregnancy

- Epithelial cell cancer represents instead 35% of all ovarian malignancies diagnosed during pregnancy

- In addition, borderline ovarian tumors (BOTs) show more aggressive features during pregnancy compared to non-pregnant women

- The lesion size (different cut-offs have been proposed) and a growth rate greater than 0.35 cm/week (10 times greater risk of malignancy) are also relevant

Surgical treatment of endometriomas depends upon whether the patient is symptomatic. Most mature teratomas are benign, but surgery may be indicated postpartum to prevent torsion

The general consensus regarding management of adnexal masses in pregnancy is to surgically resect :

Surgery in asymptomatic masses that are present after the first trimester and

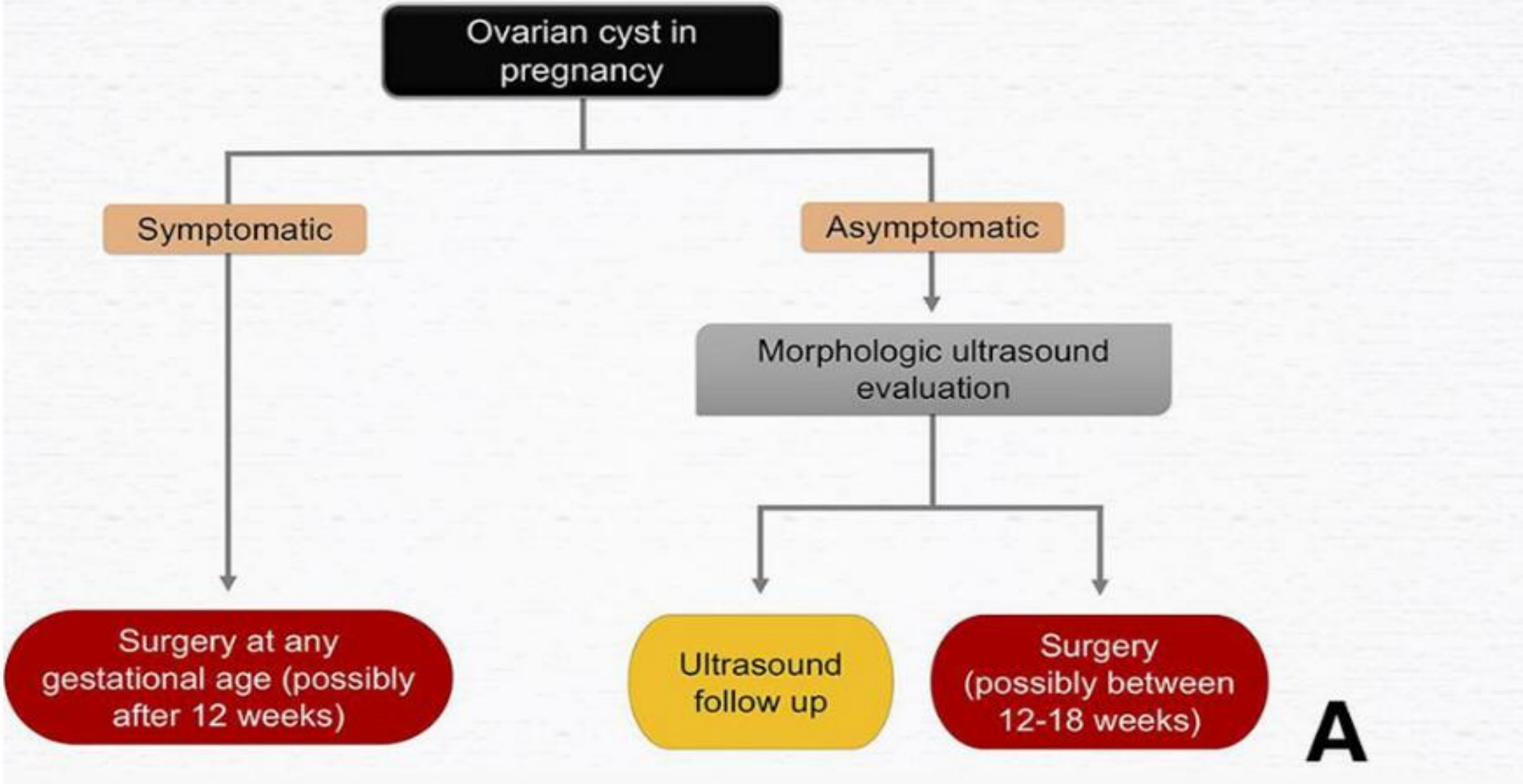
(1) are >10 cm in diameter or

(2) are solid or contain solid and cystic areas or have papillary areas or septate.

Surveillance is appropriate for cysts with these features if the sonographer is reasonably certain that the neoplasm is

- a follicular or
- corpus luteal cyst,
- endometrioma,
- or mature teratoma.

OVARIAN CYST IN PREGNANCY



- **Theca-lutein cysts** can occur when human chorionic gonadotrophin (hCG) concentrations are abnormally elevated such as in molar pregnancy, fetal hydrops, or multiple gestations

- **Hyperreactio luteinalis (HL)** is a very rare condition of cystic enlargement of the ovaries due to multiple benign theca lutein cysts, most often associated with trophoblastic disease .It does not usually require treatment and is most often found incidentally at the time of cae- sarean section. However, it can present as a mass or acute abdomen throughout pregnancy leading to a mistaken diag- nosis of malignancy or result in an inadvertently unnecessary operation.

- Similarly, **a luteoma** is a rare, benign, tumour-like mass of the ovary that emerges during pregnancy and regresses spontaneously after delivery (Choi et al. 2000). Bilateral enlarged ovaries, presenting as a mass, can be part
- of ovarian hyperstimulation syndrome (OHSS), an iatrogenic complication of assisted reproduction techniques (ART). while the severe form may occur in 0.1–3% of all ART cases where the ovaries are enlarged beyond 12 cm, but the less severe cases can be managed conservatively due to their self-limiting nature.

CT?

MRI?

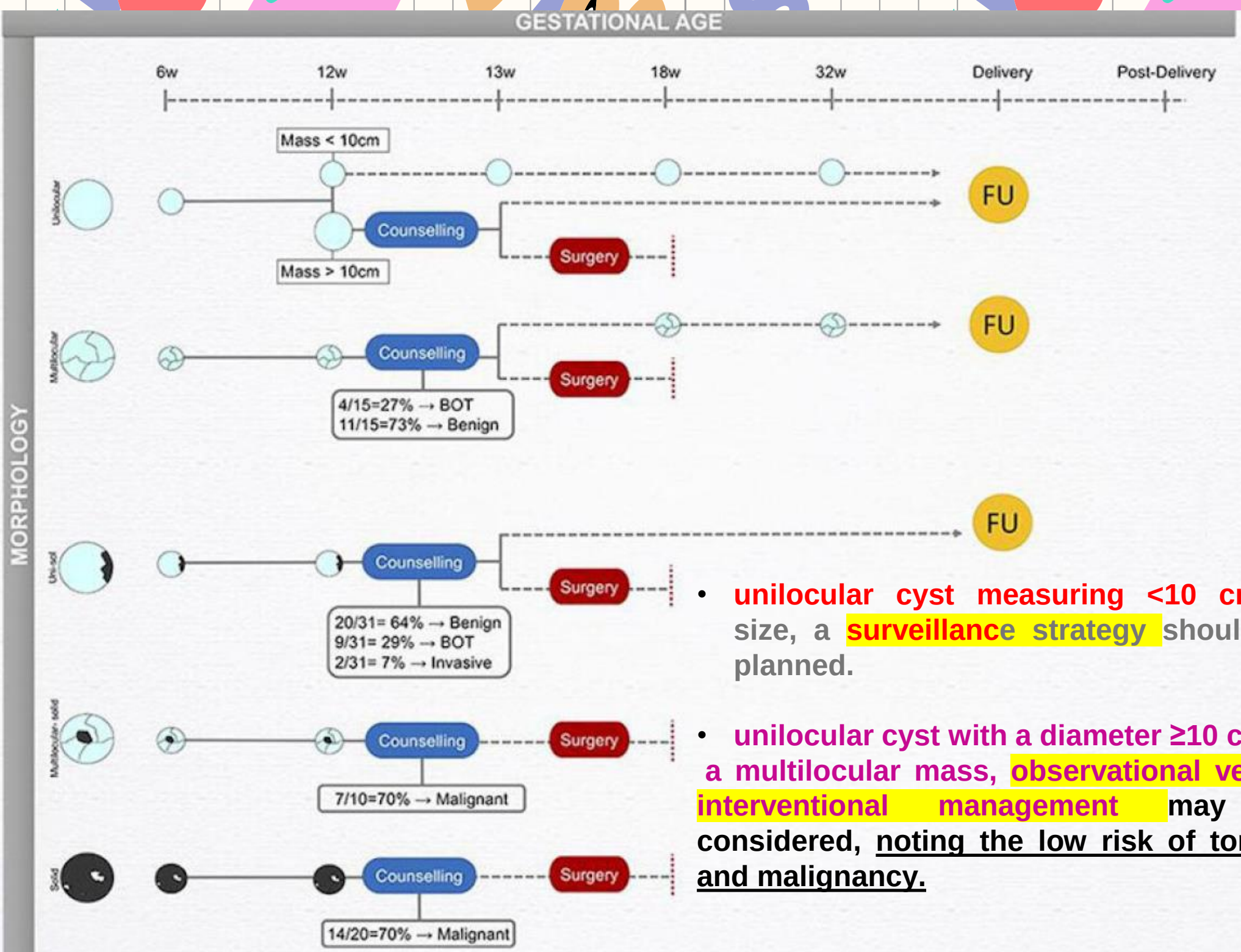
CA 125 may be helpful as a tumor marker of EOC between 15 weeks of gestation and delivery, as serum values at this time are unlikely to be markedly elevated solely as a consequence of pregnancy. A CA 125 in the range of 1000 to 10,000

•Other molecules used as makers, such as inhibin B, antimullerian hormone (AMH), human epididymis protein 4 (HE4), and Ca 19-9 are not expected to increase in pregnancy and could be used in some cases to strengthen diagnosis

Marker?

Some authors suggest that a MSAFP level above 9 MoM should prompt concern for germ cell tumors of either gonadal or nongonadal origin in the absence of **fetal abdominal wall defects or anencephaly**

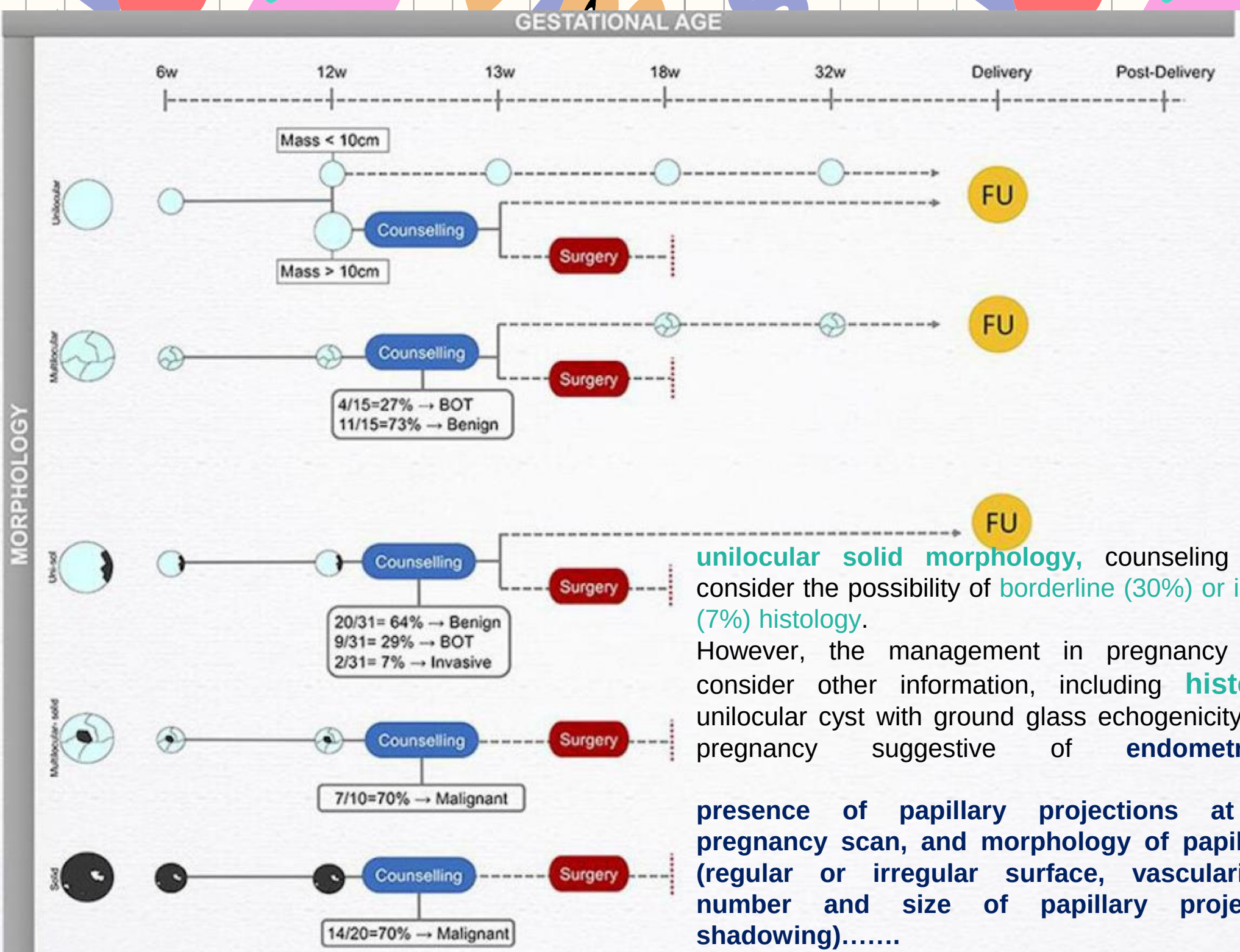
- We have described ultrasound features, management, and outcome of patients with ovarian masses detected during pregnancy in a tertiary referral center.
- We observed that the prevalence of malignancy in these pregnant patients was similar to that reported in non- pregnant patients having unilocular, unilocular solid, and solid morphology,
- but it was higher for ovarian masses with multilocular and multilocular- solid.



- **unilocular cyst measuring <10 cm** in size, a **surveillance strategy** should be planned.

- **unilocular cyst with a diameter ≥10 cm or a multilocular mass, observational versus interventional management may be considered, noting the low risk of torsion and malignancy.**

B

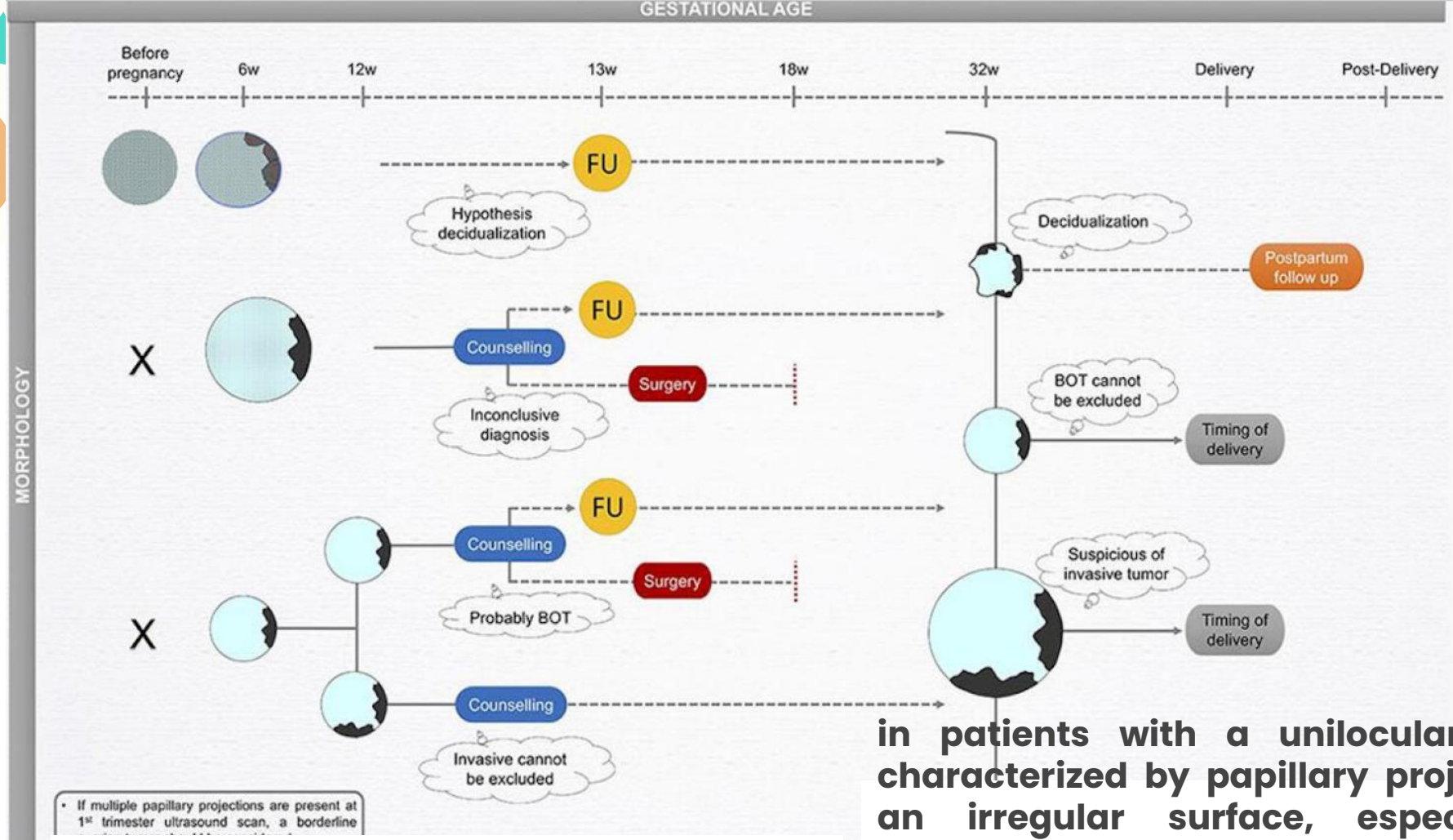


unilocular solid morphology, counseling should consider the possibility of borderline (30%) or invasive (7%) histology.

However, the management in pregnancy should consider other information, including **history** of unilocular cyst with ground glass echogenicity before pregnancy suggestive of **endometriomas,**

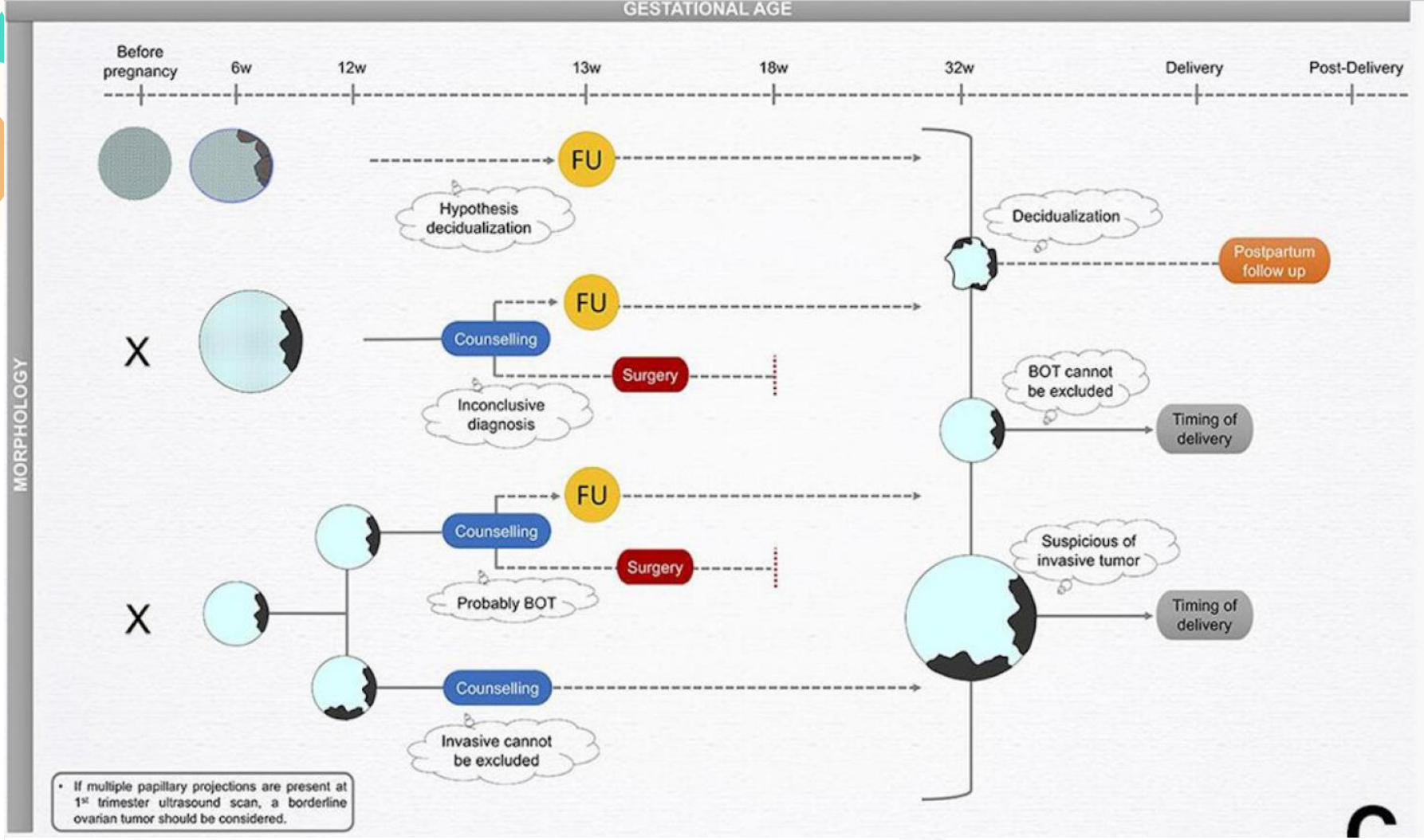
presence of papillary projections at early pregnancy scan, and morphology of papillations (regular or irregular surface, vascularization, number and size of papillary projections, shadowing)…….

B



In the presence of a unilocular solid cyst with papillary projections increasing in size and in the number of papillations from the first trimester during pregnancy, an invasive tumor cannot be excluded, and surgical exploration should be considered.

in patients with a unilocular solid cyst characterized by papillary projections with an irregular surface, especially when already detected at early pregnancy, with no evidence of morphological changes during the first half of pregnancy, a borderline histology should be considered. Management options include either surgery or surveillance, due to the good prognosis in terms of neonatal and maternal outcomes for patients with borderline tumors detected during pregnancy.



When the patient with a unilocular solid tumor has been triaged to surveillance, a scan after 32 weeks of gestation could offer additional information. Indeed, in cases of reduction in the size of the cyst, the hypothesis of decidualization is confirmed; in cases of no change in cyst morphology, benign or borderline histology should be considered.

On the other hand, a further enlargement of the cyst and papillary projections raises the suspicion of invasive histology.

In case of multilocular solid or solid masses, the risk of malignancy is significant and surgical management should be considered.

Ultrasound- guided biopsy could also represent an option to obtain the histology when the suspicion of metastases is evident.

In brief:

- Eventually surgery **can be postponed after delivery even with complex masses** in asymptomatic patient
- If the mass **is discovered during first trimester scan and US do not shows malignant features**, further evaluation is required later in pregnancy (18-22 weeks). Similarly, if the mass is discovered during second trimester in absence of malignant features, it should be checked up at 32-36 weeks.
- During last trimester, a benign ovarian mass can be managed during cesarean section (if indicated) or after 6 weeks from delivery

- Surgery should be reserved to
- 1. symptomatic patients when an acute complication occurs or
- 2. to asymptomatic patients if the adnexal mass is persistent or show ultrasound malignant features

Table 2. Ultrasound features suggestive of malignancy (Brown et al. 2010; Alalade and Maraj 2017).

1. Solid components within cyst
2. Presence of septations
3. Papillary projections $>$ 6 mm
4. Increased vascularity
5. Increase in size by 20% on subsequent scan
6. Ascites

Laparoscopy?

The vertical midline incision?

Cystectomy or salpingo-oophorectomy?

If the mass is larger than 10 cm,
If the mass is solid,
has surface excrescences,
is associated with ascites,
or has other features suggesting malignancy,

should be sent for frozen section?

the pathologist informed of the concurrent pregnancy

biopsy or wedge resection of a normal-appearing contralateral ovary?

Staging?

In certain malignant germ cell tumors of the ovary (eg, endodermal sinus tumors), lymph node dissection may be omitted,

Laparoscopy?

- Anyway, emerging evidences are showing that laparoscopy could be safely performed in any trimester
- Laparotomy is preferred for malignancy, but especially in early stages or in borderline ovarian tumors, laparoscopy could find its application. Laparoscopy has been demonstrated to be safe for staging surgery for borderline ovarian tumors and this approach can preserve fertility of younger patients

Laparoscopy?

1. Another concern for laparoscopy during pregnancy has been arisen by the increased intra-abdominal pressure and fetal acidosis due to carbon-dioxide pneumoperitoneum. Increased abdominal pressure could reduce venous return, especially in women with impaired cardiac output .therefore, determining hypotension and hypoxia and consequent reduction in uteroplacental blood flow. Furthermore, fetus could absorb carbon- dioxide across peritoneum and experiment acidosis
2. If maternal blood pressure is maintained stable and carbon-dioxide insufflation between 3.7-4.3 kPa, no adverse outcomes have been reported Establishment of pneumoperitoneum should be gradual, with careful monitoring of hemodynamic status
3. . Anyway, intrabdominal pressure between 8 and 12 mm Hg and not exceeding 15 mmHg should be maintained during laparoscopies in pregnant women with neither maternal nor fetal adverse outcome

Laparatomy?

1. undergoing laparotomy for adnexal mass with regional anesthesia had higher risk of preterm labor compared with patients who received general anesthesia. But long- term studies are not available. General anesthesia comes with reduced risk of aspiration, good muscle relaxation, and controlled ventilation therefore is preferred to local approach
2. A systemic review failed to demonstrate positive effects of routinary administration of tocolisis for women who underwent surgery during pregnancy. therefore, its use should be tailored.

3. There is no evidence that electrosurgery is harmful to the fetus. Amniotic fluid, in fact, due to its composition rich in electrolytes is thought to be protective for the baby. Literature does not suggest increased risk of energy related complications with any type of energy device

Adnexal mass at cesarean delivery

— **At cesarean delivery, any adnexal mass that appears suspicious for malignancy** should be removed and sent for frozen section.

Complete surgical removal is preferred to aspiration and cytologic evaluation of cystic fluid, since malignancy could be missed with the latter.

__ **If** the mass is an incidental finding at cesarean delivery, the patient typically will not have an appropriate incision for surgical staging. In these cases, if frozen section indicates malignancy, **salpingo-oophorectomy** is performed and postpartum, the patient is referred to a gynecologic-oncologist for counseling, staging, and possible hysterectomy within the next 1-2 weeks.

If an adnexal mass suspicious for malignancy is detected antepartum, the patient should be counseled and consented appropriately. Cesarean delivery should be performed through a midline incision, and a gynecologic oncologist should be available, if required. After delivery of the infant and placenta and control of bleeding, the adnexal mass is resected and sent for frozen section. If positive for malignancy, full surgical staging can be performed.

Management!

In brief

Expectant management is advised for most cys- tic lesions less than 6 cm in size The majority of functional cysts, around 70%, will undergo spontaneous resolution before 16weeks

A follow-up ultrasound can be offered for cysts larger than 6cm or complex in appearance in 4 to 6 weeks' time .This process can be repeated throughout the pregnancy to monitor for malignant change.

Most cases of ruptured cysts are uncomplicated and thus suitable for observation, with the pain often resolving within 48h

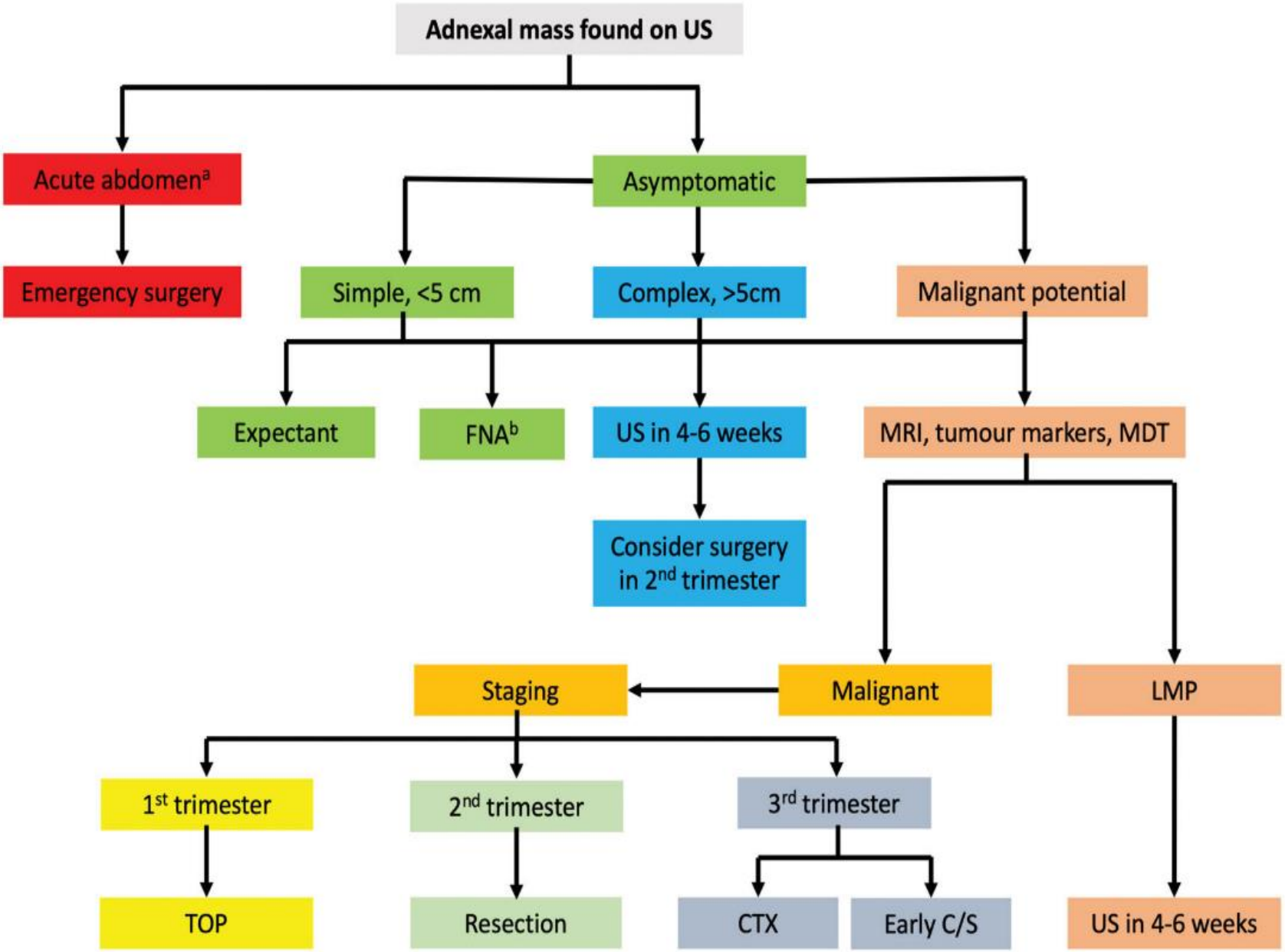


Figure 1. An approach to adnexal masses in pregnancy (Glanc et al. 2008; Alalade and Maraj 2017). [a]Includes any cause warranting emergency surgery including acute abdomen, haemodynamic instability, diagnostic uncertainty, probability of torsion, symptoms persisting beyond 48 h, increasing haemoperitoneum, falling haemoglobin concentration and fever and leucocytosis. [b]Use caution as this is a controversial treatment method. US: ultrasound, FNA: fine needle aspiration; MRI: magnetic resonance imaging; MDT: multidisciplinary team; LMP: low malignant potential; TOP: termination of pregnancy; CTX: chemotherapy; C/S: caesarean section.

- Tocolytics should not be used prophylactically in pregnant women undergoing surgery but should be considered perioperatively when signs of preterm labour are present or other risk factors for this exist
- Furthermore, anti- biotics should be prescribed as for non-pregnant patients with the exception of teratogenic agents.
- Maternal corticosteroids for fetal lung maturation for surgery between 24 to 34 weeks should be provided if time permitting

- Preoperative, intraoperative and postoperative fetal monitoring is recommended in abdominal surgery in a mother with a viable foetus
- Prior to 26 weeks of gestation, Doppler auscultation is adequate, however, after 26 weeks a cardiotocograph is usually performed but this is centre-dependent. Although this has not been found to improve mortality, it does allow for early identification of fetal.

- Postpartum considerations For women with persistent masses during their pregnancies,
- postpartum surveillance via ultrasound is recommended. An initial scan at 6 weeks' postpartum is considered to be rea- sonable; by that time the woman should likely be suitable to undergo elective surgery if needed

THANK YOU!