

# DIAGNOSIS OF MULTIPLE GESTATION

FLAME LECTURE: 109

WHITE 7.30.19

# LEARNING OBJECTIVES

- ▶ Describe the embryology of multifetal gestation
- ▶ Describe diagnosis of multifetal gestation
- ▶ Describe unique maternal physiologic changes and complications associated with multifetal gestation
- ▶ Prerequisites:
  - ▶ None
- ▶ See also – for closely related topics
  - ▶ **FLAME 110**: Management of Multiple Gestation

# INTRODUCTION

- ▶ Multiple/multifetal gestation is defined as the presence of >1 fetus in the uterus
- ▶ 1/33 of live births in US are twins
- ▶ 1/837 births are triplets or higher
- ▶ There has been a 76% increase in twin birth rate since 1980
  - ▶ Likely attributed to increasing ART and advanced maternal age
- ▶ Number of fetuses in the gestation does not affect reporting of gravidity/parity
  - ▶ Ex: A mother who just had her first pregnancy and delivered twins at full term would be: G1P1002

# NOMENCLATURE

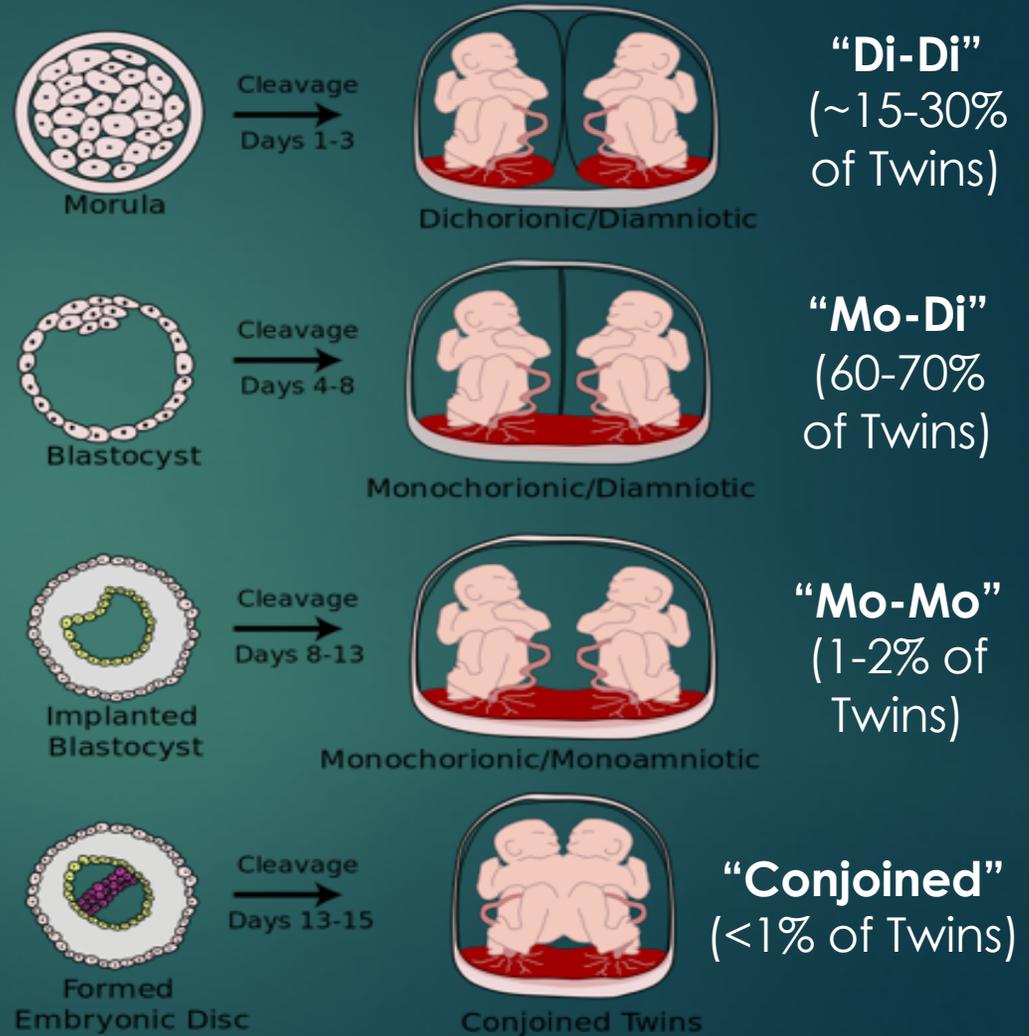
## ▶ Dizygotic (67-80%): “Fraternal twins”

- ▶ When 2 individual eggs are each fertilized by 2 separate sperm resulting in 2 zygotes (dizygotic) and thus, 2 **genetically distinct** fetuses
  - ▶ Can therefore be different sexes
- ▶ Each fetus will ALWAYS have their own separate placenta (*chorion*) and amniotic sac (*amnion*)
  - ▶ Thus, they are dizygotic dichorionic diamniotic “DZ/DC/DA” or “Di-Di”

## ▶ Monozygotic (20-33%): “Identical twins”

- ▶ When 1 sperm fertilizes 1 egg resulting in 1 zygote (monozygotic) and this zygote then splits into 2+ **genetically identical** fetuses
- ▶ The timing of WHEN this zygote splits is critically important in determining what type of monochorionic twins they will become (see next slide)
- ▶ The twins may have their own separate placentas and sacs (and are thus indistinguishable from dizygotic twins), can have their own sacs but share a placenta, share one sac and one placenta, OR be conjoined

- ▶ In monozygotic twins, the degree of separation depends on the day of zygote cleavage:
  - ▶ DC/DA: Day 1-3
  - ▶ MC/DA: Day 4-8
  - ▶ MC/MA: Day 8-13
  - ▶ Conjoined: Day 13-15
- ▶ The same separation issues can happen with higher order multiples like triplets, but determining their chorionicity becomes even harder
  - ▶ As one example, you can even have two of the three fetuses sharing one placenta, and a third with their own placenta ("Di-Tri")

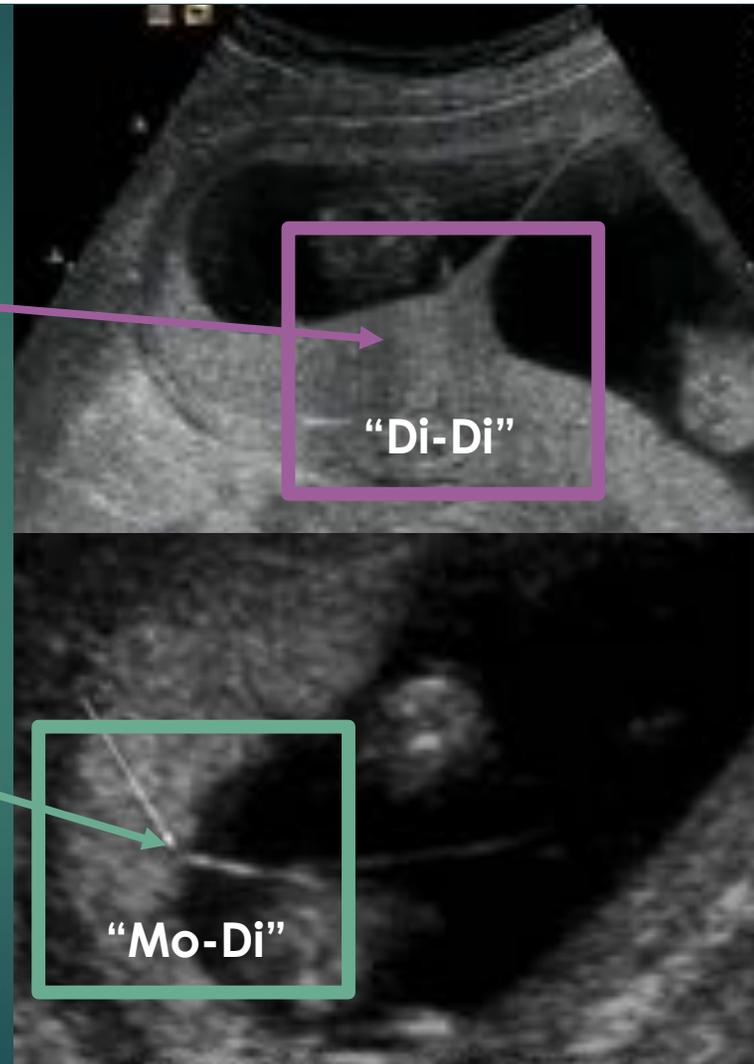


# DIAGNOSIS

- ▶ The best time to evaluate for multiples and to determine what type of multiples they may be is with a 1<sup>ST</sup> trimester ultrasound
  - ▶ Determining what type of multiples they are is important, because each type carries unique risks that vary in severity (see future slides)
- ▶ The most reliable indicator of *dichorionicity* is if 2 distinct placentas are visualized by US in different parts of the uterus
  - ▶ However, sometimes there may be two placentas that have fused and look like one placenta, and the earlier you are able to look with US after 6 weeks, the easier it will be to distinguish between the two
  - ▶ We will explore this on the next slide
- ▶ Another trick in patients who present for an US at a later gestational age, is if different genders are identified by ultrasound, they **MUST** be dizygotic and therefore dichorionic/diamniotic

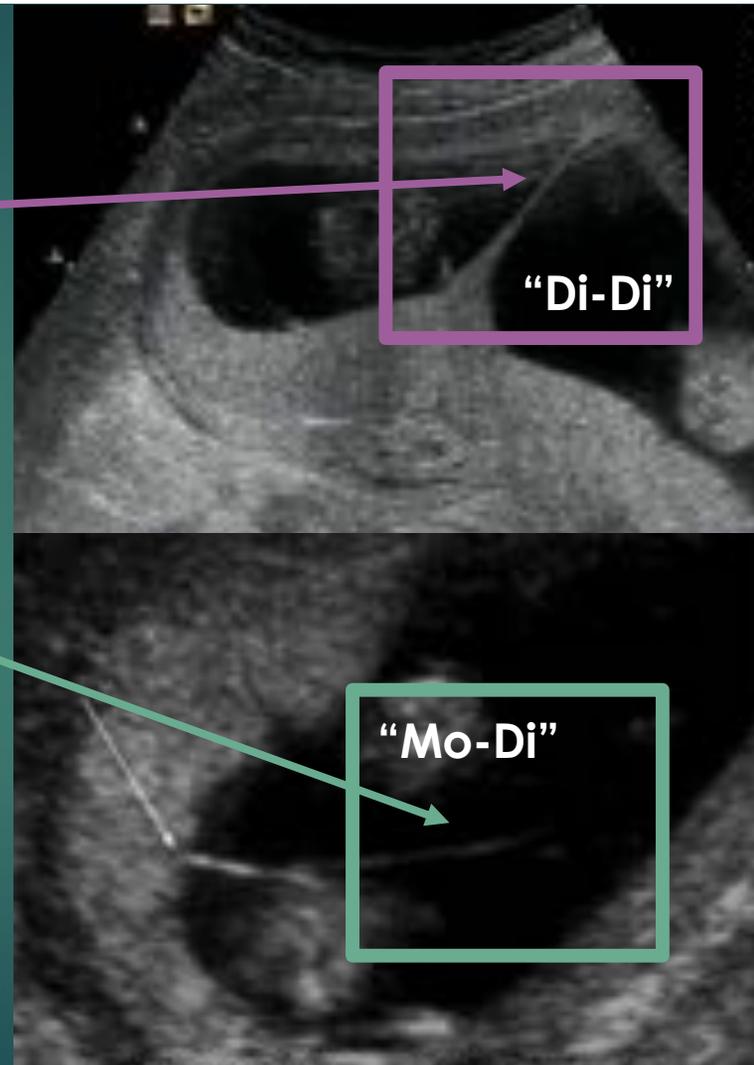
# CHORIONICITY

- ▶ One way to distinguish if there are two placentas is if you see the “Twin peak” or “Lambda” sign, referring to a thick triangular inter-twin membrane consisting of chorion fused between 2 amnion layers (a total of 4 layers) which indicates there are two amniotic sacs and two placentas
- ▶ Alternatively, if a “T-sign” depicting a thin inter-twin membrane only containing 2 layers of amnion is seen, this likely means that there are two amniotic sacs and one placenta



# CHORIONICITY

- ▶ Another hint, is to evaluate what the intervening membrane appears like
- ▶ Is it a *thick membrane* (made up of 4 total layers of amnion and chorion) indicating there are likely two amniotic sacs?
- ▶ Or is there a *thin, wispy membrane*, (made up of 2 layers of amnion), indicating that there are likely two amniotic sacs, but one placenta?
- ▶ Lastly, if two fetuses are seen with no membrane separating the two sacs, or even two umbilical cords entangling, it is more than likely a Mo-Mo twin set sharing one sac



# MATERNAL PHYSIOLOGY

- ▶ Multiples are associated with much higher maternal and fetal morbidity than singleton pregnancies, and part of this has to do with the effect on maternal anatomy/physiology
- ▶ 10% increase in maternal resting energy expenditure in twin pregnancies vs. singletons
- ▶ 20% increase in maternal cardiac output (twins vs. singletons)
  - ▶ Stroke volume (+15%) and heart rate (+3.5%)
- ▶ Anatomical effects of increased abdominal mass:
  - ▶ Increased dyspnea and use of accessory muscles of respiration (due to loss of abdominal tone)
  - ▶ Increased urinary urgency/frequency due to bladder pressure
- ▶ Increased maternal weight gain:
  - ▶ Recommended weight gain in normal BMI patients: 37-54 lbs vs. 25-35 lbs in singleton
  - ▶ Recommended weight gain in overweight patients: 31-50 lbs vs. 15-25 lbs singleton
  - ▶ Recommended weight gain in obese patients : 25-42 lbs vs. 11-20 lbs singleton
- ▶ Higher nutritional needs: 1.5-2x increase in folic acid, iron, and calcium supplementation recommended given higher needs of growing fetuses

# MATERNAL COMPLICATIONS

- ▶ Independent from the risks of ART, there are a number of additional maternal and fetal complications
  - ▶ The fetal complications are highlighted in [FLAME 110](#) – Mgmt of Multiple Gestation
- ▶ Increased risk of developing hyperemesis gravidarum
- ▶ Increased risk of gestational diabetes
- ▶ Increased risk of gHTN / preE / HELLP
  - ▶ Singletons (6.5% of pregs) vs. Twins (12.7%) vs. Triplets (20%)
- ▶ Increased risk of abruption, hemorrhage, and anemia
- ▶ Increased risk of cesarean delivery and its associated risks
- ▶ Increased risk of postpartum depression
- ▶ Increased risk of venous thromboembolism (VTE)

## IMPORTANT LINKS / REFERENCES

1. [PRACTICE BULLETIN 169 – MULTIFETAL GESTATION](#)
2. [COMMITTEE OPINION 553 –MULTIFETAL PREGNANCY REDUCTION](#)
3. Norowitz et al. Maternal Physiology and Complications of Multiple Pregnancy. Seminars in perinatology 2005
4. Campbell and Templeton, Obstet Gynecol 2004.
5. Simpson LL, SMFM Guideline. AJOG Jan 2013