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Staging of Twin-To-Twin Transfusion Syndrome Using Ultrasound

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Introduction

Twin-to-twin transfusion syndrome (TTTS) is a rare condition found in pregnancies with identical twins where the fetuses share a placenta, diagnosed between 16-24 weeks of gestation (Durbin, 2011). This results in one fetus as the recipient and one as the donor. The recipient twin presents with polyhydramnios and a large bladder while the donor twin presents with oligohydramnios and a small bladder. The donor twin also suffers from cardiomegaly and impaired cardiac contractility (McCarthy et al., 2019).



(InspireMore, 2019). Abnormal nuchal translucency and crown rump length can also be associated with TTTS (Mackie, 2017). Dr. Ruben Quintero developed a staging classification for cases of TTTS, based on several factors that are identified using ultrasound imaging ("Stages of Twin," n.d.). Developed in 1997, Dr. Quintero's staging system has led to a general agreement on the condition of the fetuses and has led to different treatment/management options.

Statistics

"TTTS is a condition affecting 10% to 15% monochorionic pregnancies and is associated with a high risk of perinatal mortality and morbidity" (Durbin, 2011). Untreated- >90% mortality rate, 30% of survivors have some type of neurodevelopmental problem (Durbin, 2011).

Staging by Ultrasound

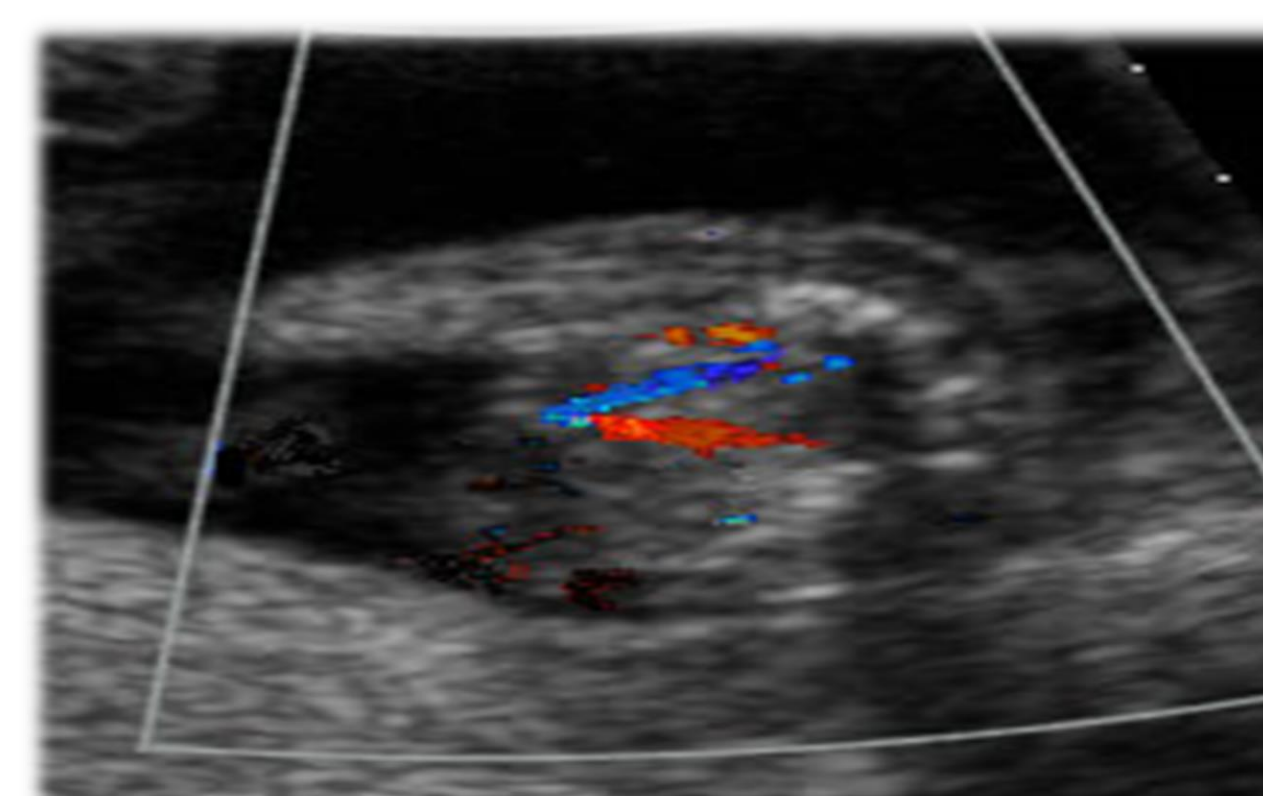
"The severity of TTTS is graded by the characteristics of amniotic fluid volume, bladder filling and multiple features of cardiovascular function, in five stages" ("Stages of Twin," n.d.).

- Stage I: Bladder in the donor twin still visible

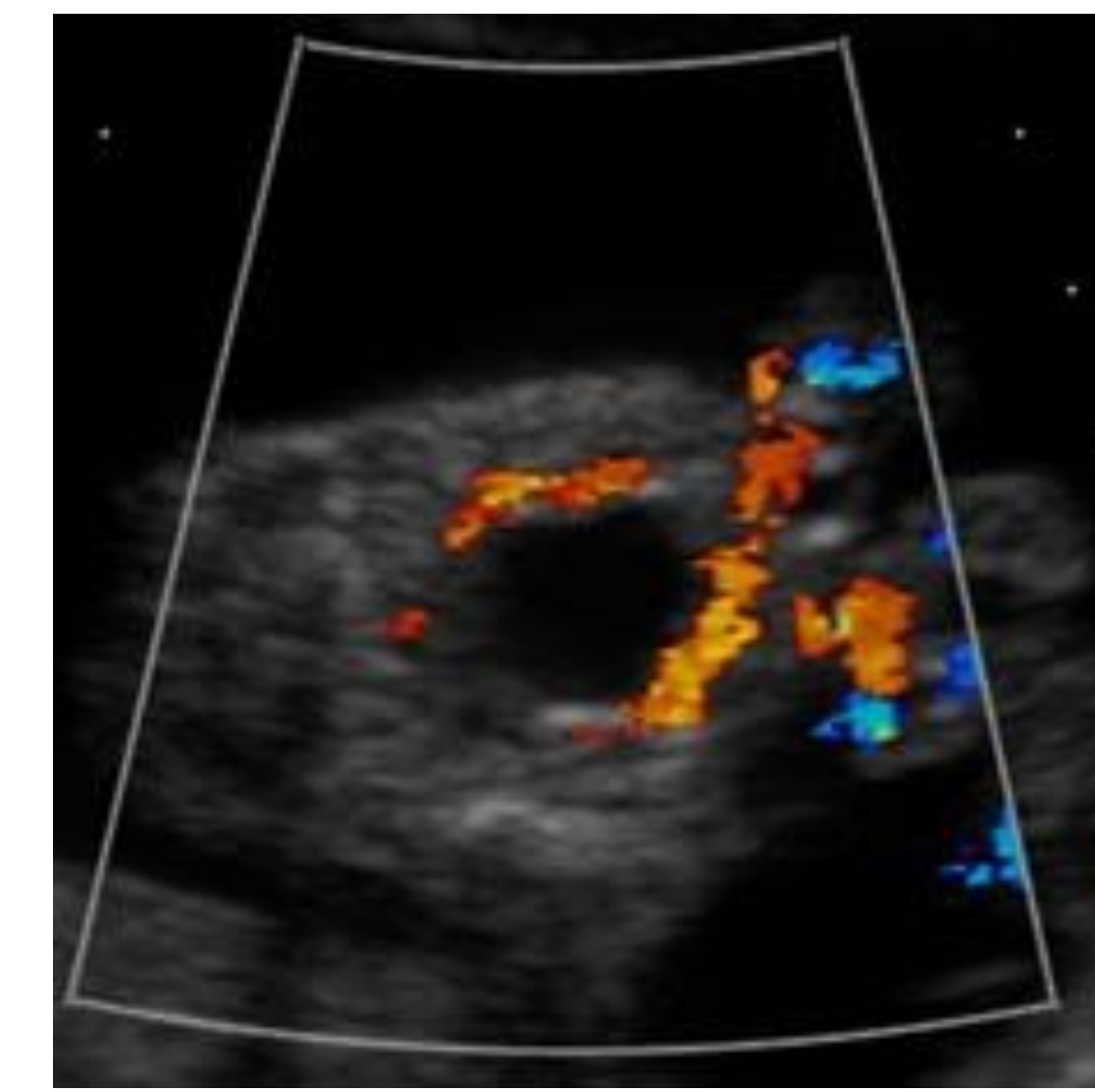


Oligohydramnios in donor twin ("Stages of Twin," n.d.).

- Stage II: Bladder in the donor twin not visible, no critically abnormal Doppler findings

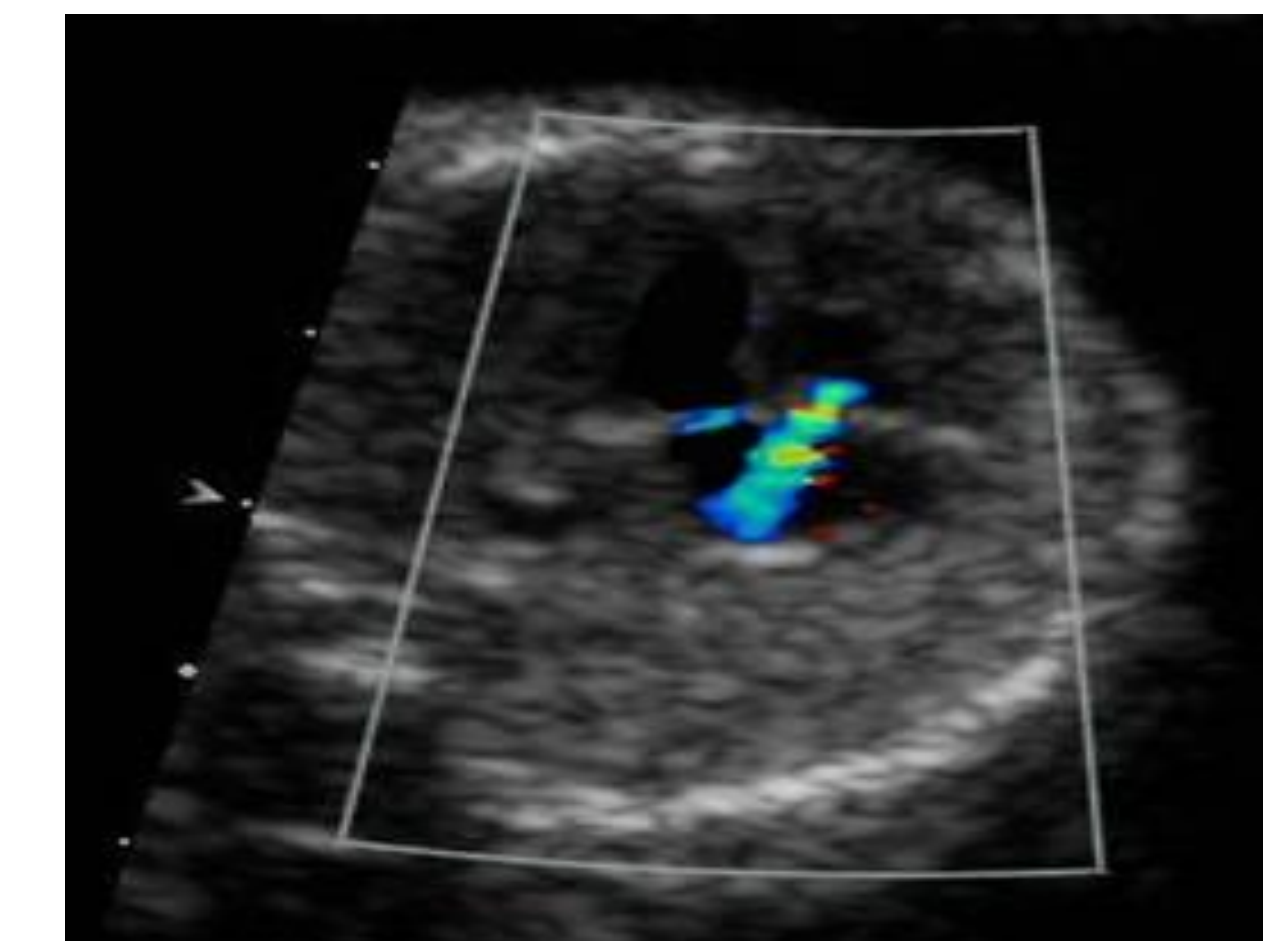


Absent bladder filling in the donor ("Stages of Twin," n.d.)



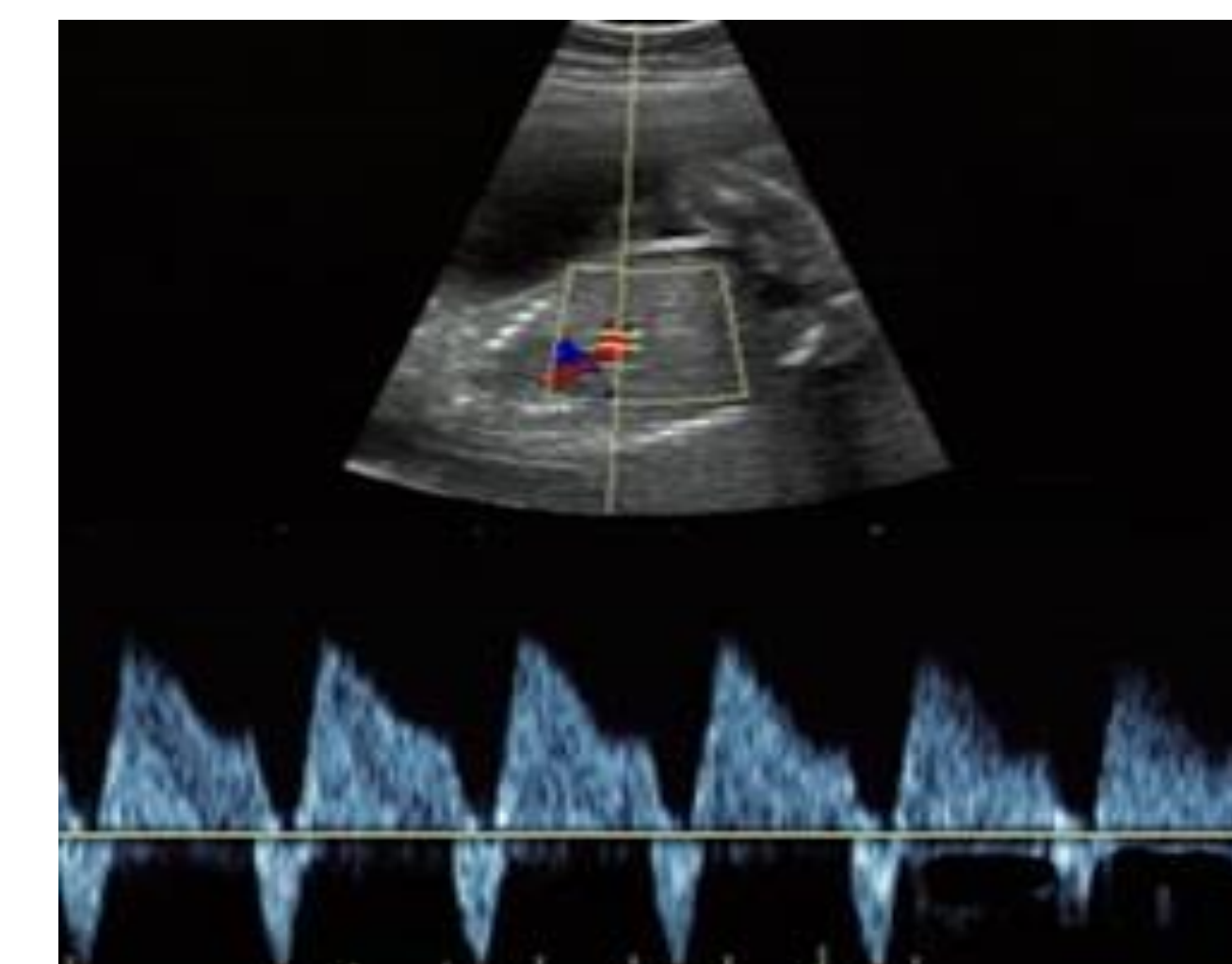
Overfilling of the recipient bladder ("Stages of Twin," n.d.)

- Stage III: Critically abnormal Doppler findings



blood flowing backwards through the tricuspid valve due to borderline heart failure ("Stages of Twin," n.d.).

- Stage IV: Hydrops

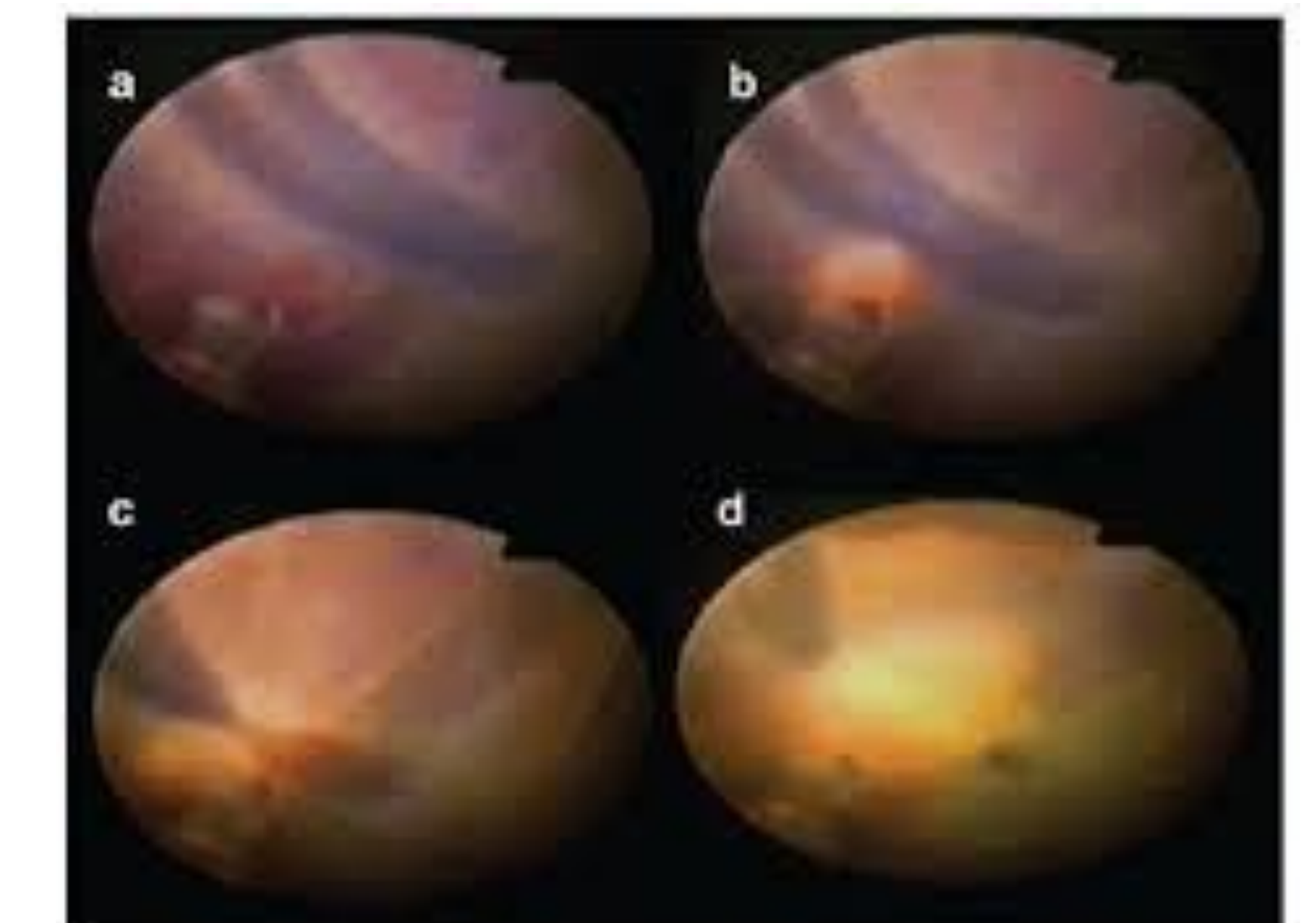


blood running backward during the cardiac cycle ("Stages of Twin," n.d.)

- Stage V : Fetal demise of one or both fetuses

Treatment

Treatment choice is dependent on the stage of TTTS, but the most common is fetoscopic laser coagulation. Fetoscopic laser coagulation is the destroying of the anastomoses within the placenta, to break the placenta into two distinct regions (Simpson & Miller, 1999). Other treatments include amnioreduction, septostomy, and termination of pregnancy. Amnioreduction is the removal of excess fluid while septostomy is the creating of a hole of the membrane between the twins to equalize the amniotic fluid (Simpson & Miller, 1999).



Fetoscopic laser coagulation (Ruano, Brizot, Liao, & Zugaib, 2009).

Conclusion

The Quintero Staging System is crucial to the diagnosis, management, and treatment of twin-to-twin transfusion syndrome. It is important for sonographers to understand the appearance of each stage so that the proper images are taken for the best patient outcome.