The inevitable demise of clinical skills in examination of patients

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Introduction

The ''systematic observation of patients'' began about 430 years before the birth of Christ when Hippocrates and other Greek doctors began to look at the issues of poor health and disease by using a process of reasoning and observation. This process subsequently led to the evolution of the clinical quartet of observation, palpation, percussion and auscultation and for many centuries important diagnoses were made using the approach of history taking and clinical evaluation. The use of technology in modern medicine has complemented this process of systematic clinical evaluation and for some disease conditions technology-assisted diagnosis is superior to clinical evaluation alone. Medical technology and specifically the advances of modern ultrasound are becoming ever more important in obstetrics. Ultrasound is an easy, quick and cost-effective imaging technique without any known adverse effects on the mother or developing fetus.[1] The use of technology also helps to diagnose certain disease conditions, before overt clinical symptoms and signs manifest, and thus help to reduce potential complications.

Early pregnancy
Ectopic pregnancy

Ectopic pregnancy is a considerable cause of morbidity and mortality and is responsible for 1.4% of maternal deaths in South Africa.[2] Less than 50% of patients present with the classic picture of a history of amenorrhea, abdominal pain, irregular vaginal bleeding and cervical excitation tenderness on vaginal examination. Abdominal pain and vaginal bleeding are highly sensitive (97% and 69% respectively) but are not specific (15% and 26%) for ectopic pregnancy. Cervical excitation tenderness is most specific at 91% but has a poor sensitivity rate of 33%.[3] Transvaginal ultrasound for women attending an early pregnancy unit has shown to be an accurate diagnostic test for ectopic pregnancy with a sensitivity of 87-99% and a specificity of 94-99%.[4] Early diagnosis decreases maternal morbidity and mortality, helps preserve future reproductive function and gives patients an option of ambulatory medical therapy.

Mid-gestation
Small for gestational age (SGA) fetuses

The most common methods used to diagnose SGA fetuses are abdominal palpation, measurement of symphyseal fundal height,

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ultrasound biometry, ultrasound estimated fetal weight and doppler flow velocimetry. In several countries a clear distinction is made between high and low risk pregnancies by obstetric care-givers and in certain obstetric units, abdominal palpation is the only screening test for intra-uterine growth restriction (IUGR) in low risk groups.[5] Therefore the detection of IUGR depends on the effectiveness of abdominal palpation. Examination of the abdomen by inspection and palpation only detects about 30% of SGA fetuses, so if SGA is suspected, it is necessary to supplement abdominal palpation with ultrasound biometric tests.[6,7] A study involving 2941 women found the sensitivity and specificity of symphyseal fundal height measurement to be 27% and 88% respectively.[8] Serial measurements may improve sensitivity and specificity, but the impact on perinatal outcome is uncertain. The use of customised fundal height charts improves the accuracy to predict a SGA fetus, resulting in an improvement in the sensitivity to 48% and a reduction in hospital admissions.[9]

Ultrasound biometry of the fetal abdominal circumference and estimated fetal weight are the most accurate diagnostic measurements to predict SGA with reported sensitivities of 72-94% and specificities of 50-84% for abdominal circumference and 33-89% and 53-90% for effective fetal weight respectively.[10] The use of umbilical artery doppler as a primary surveillance tool in high risk pregnancies is associated with a significant reduction in the number of antenatal admissions, reduction of perinatal morbidity and mortality and inductions of labour.[11]

Mutiple pregnancy

Twin pregnancies may be diagnosed clinically by the following findings:
- Fundal height more than anticipated
- Excessive fetal parts
- Small fetal head in proportion to the size of the uterus
- Palpation of at least 3 fetal poles
- Auscultation of 2 fetal hearts

Ultrasound, however is the gold standard for diagnosing multiple pregnancies as it is superior to symphyseal fundal height measurement and palpation in determining the presence of multiple pregnancy.[12] Ultrasound also provides important information about chorionicity. Many obstetric units perform routine early ultrasonography as this practice enables better gestational age assessment, earlier detection of multiple pregnancies and earlier detection of clinically unsuspected fetal malformation.[13] If multiple pregnancies are diagnosed using routine ultrasonography there will be no need for further abdominal palpation and this skill will be lost.

Fetal weight estimation

Monitoring fetal growth is a standard component of antenatal care. Abnormalities of fetal growth are associated with an increased risk of adverse perinatal outcome so information provided by fetal weight estimation often determines how the pregnancy and delivery is managed. Fetal weight estimation may be performed by abdominal palpation or by ultrasound measurement of various fetal parameters. Several studies have shown that clinical estimates of fetal weight by an experienced clinician in the late third trimester and intra-partum correlate well with ultrasound.[14] However, ultrasound performs better at the most clinically relevant function of estimating fetal weight, i.e. predicting the low- or high-birth-weight fetus. In centres where ultrasound is readily available, estimation of fetal weight by palpation of the abdomen is rarely done in clinical practice because we have come to rely so heavily on ultrasound.

Labour and delivery
Breech delivery

About 3-4% of foetuses are in a breech presentation at term. Since the publication of the Term Breech trial the rates for caesarean section for breech presentation has increased worldwide and in the United States, caesarean delivery for breech presentation rose from 12% in 1970 to 87% in 2001.[15] The term breech trial showed that a policy of elective caesarean delivery was associated with significant decrease in perinatal morbidity and mortality, with only a modest increase in short-term maternal mortality, compared with planned vaginal delivery.[16] Further evidence supporting the findings of the Term Breech trial was provided by a systematic review involving 2496 participants.[17] Planned caesarean section was associated with a reduction in perinatal or neonatal death (RR 0.29, 95% CI 0.10-0.86) and a reduction in serious neonatal morbidity (RR 0.33, 95% CI 0.19-0.56). In a further subgroup analysis, prelabour caesarean delivery was associated with a lower risk of adverse perinatal outcome than caesarean performed during labour, especially if the labour was associated with labour augmentation and pushing for more than 60 minutes.[18] Planned caesarean delivery is also not more costly than planned vaginal birth. In the Term Breech Trial, when all costs related to maternal and neonatal physician services and hospitalisation from randomisation to 6 weeks postpartum were taken into account, the overall cost of planned caesarean section was $7255 versus $8042 (Canadian dollar) for planned vaginal birth. However, a 2-year follow-up of the Term Breech Trial showed no difference in the primary outcome, death or neurodevelopmental delay at age 2 years (RR 1.09, 95% CI 0.52-2.30).

Although the evidence supporting planned caesarean section is convincing, all obstetricians should be able to perform a vaginal breech delivery. A policy of planned caesarean may not be feasible in resource-poor settings. There may be other clinical situations where the risks of caesarean delivery to the mother, or the mother's desire to avoid caesarean delivery may outweigh the risks of vaginal birth to the baby.

Operative vaginal delivery

Operative vaginal delivery refers to the use of a vacuum or forceps to assist in delivering the baby. The alternative approach is caesarean section in the second stage of labour. Instrumental deliveries were first performed to assist mothers who were at high risk of maternal mortality due to prolonged or obstructed labour.[19] Saving the mother's life was more important than the risk of possible harm to the fetus. Advances in the safety of modern anaesthesia and surgical technique has resulted in a shift in the focus of these procedures. Therefore the possible maternal and fetal complications of these procedures are now weighed against the alternative option of caesarean section. It is for these reasons that the overall rate of operative vaginal delivery is now decreasing.

Short-term maternal complications associated with instrumental delivery include, perineal pain, lower genital tract lacerations and hematomas, urinary retention and incontinence, anemia and anal incontinence. A review of 50 210 vaginal deliveries concluded that maternal complications are more likely to be associated with instrumental delivery than with spontaneous vaginal delivery.[20] In this study the rates of third and fourth degree tears were 2% for spontaneous, 10% for vacuum extraction and 20% for forceps delivery. Long-term maternal sequelae are associated with problems related to urinary and anal function. In a prospective cohort study in women in the second stage of labour who underwent either instrumental or caesarean delivery, the incidence of urinary incontinence after one and three years was 2% in the caesarean section group compared with 10% in the instrumental delivery group.[21]
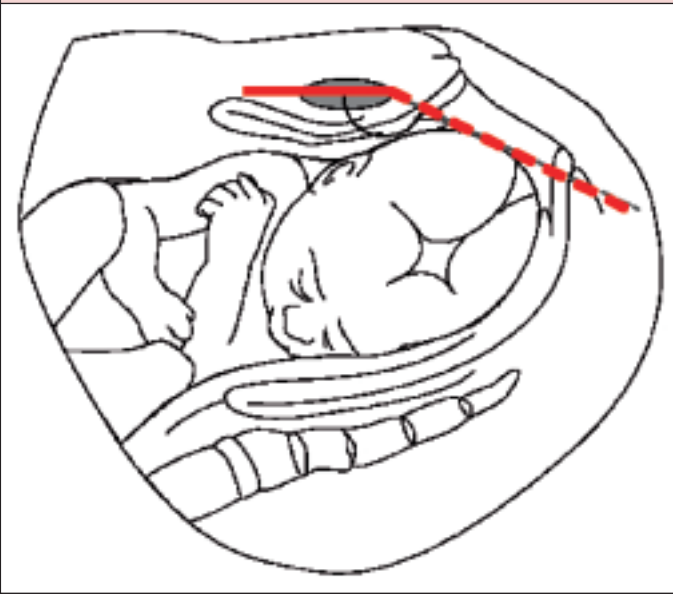
The short-term complications for the fetus include intracranial haemorrhage, bruises, lacerations, facial nerve palsy, cephalohematoma and skull fractures. In 1998 the United States Food and Drug Administration issued a warning about the possible risks associated with vacuum delivery.[22] This followed reports of infant deaths secondary to intracranial haemorrhage. Long-term neurodevelopmental outcomes for children born by assisted delivery have also been noted as a concern.

Although indications for operative delivery have changed over time, this skill should be learnt by all practitioners involved in obstetric care. The American College of Obstetricians and Gynaecologists recognise certain indications for operative delivery but suggest further that no indication is absolute, each case should be considered individually and caesarean delivery is also an option in these clinical settings.[23] The indications for operative vaginal delivery include, prolonged second stage of labour, non-reassuring fetal status and maternal cardiac or neurological disease.

Sonographic evaluation to assess fetal head descent in labour

Prior to the development of the partogram, the evaluation of labour was subjective and monitored according to its duration. The partogram has provided a more objective assessment of the progress of labour by plotting cervical dilatation and fetal station as a function of time. Unfortunately estimation of station by digital vaginal examination is imprecise and poorly reproducible.[24] Ultrasound has been found to be superior to digital vaginal examination in determining fetal station prior to operative vaginal delivery and will most likely, in the future, contribute substantially to the clinical management of the second stage of labour. The angle (figure 1) between the pubic symphysis and the leading part of the fetal spine, ("angle of progression") may be measured using transperineal or translabial ultrasound and is now used in some centres to predict which patients will deliver vaginally and which are at risk of abdominal delivery. Barbera et al have found that an angle of progression of > 120˚ in the second stage of labour was associated with subsequent spontaneous vaginal delivery in all study patients.[25] The "angle of progression" was also associated with the duration of the examination-to-delivery interval and there was a good correlation with the clinical assessment of progress. These findings were confirmed by Kalache et al and among 26

Figure 1: Angle of progression. In this figure the angle of progression is >120°

cases with an occiput anterior position an angle of progression of >120° was associated with a successful vaginal delivery of 90%.[26] Ultrasound is most definitely going to be used with increasing frequency in the management of labour because it has the potential to predict ''true'' failure to progress in labour. It may also aid with regards to operative vaginal delivery.

Conclusion

Medicine is a dynamic field and diagnoses and treatment will always change as we alter our practice in line with evidence based guidelines. As medicine evolves, the nature of our clinical skills may change. Physicians will rely more and more on advances in technology to assist in making diagnoses and treating patients. However, in an imperfect world with limited resources and lack of universal access to technology, clinical skills are still extremely important. In certain clinical scenarios, a more traditional method of treatment may be indicated. Where we are unable to perfect these skills in everyday clinical practice we should ensure that we are competent by regularly using models or computer assisted teaching aides. Therefore technology and clinical practice should be complementary and technology should never replace good clinical skills.

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