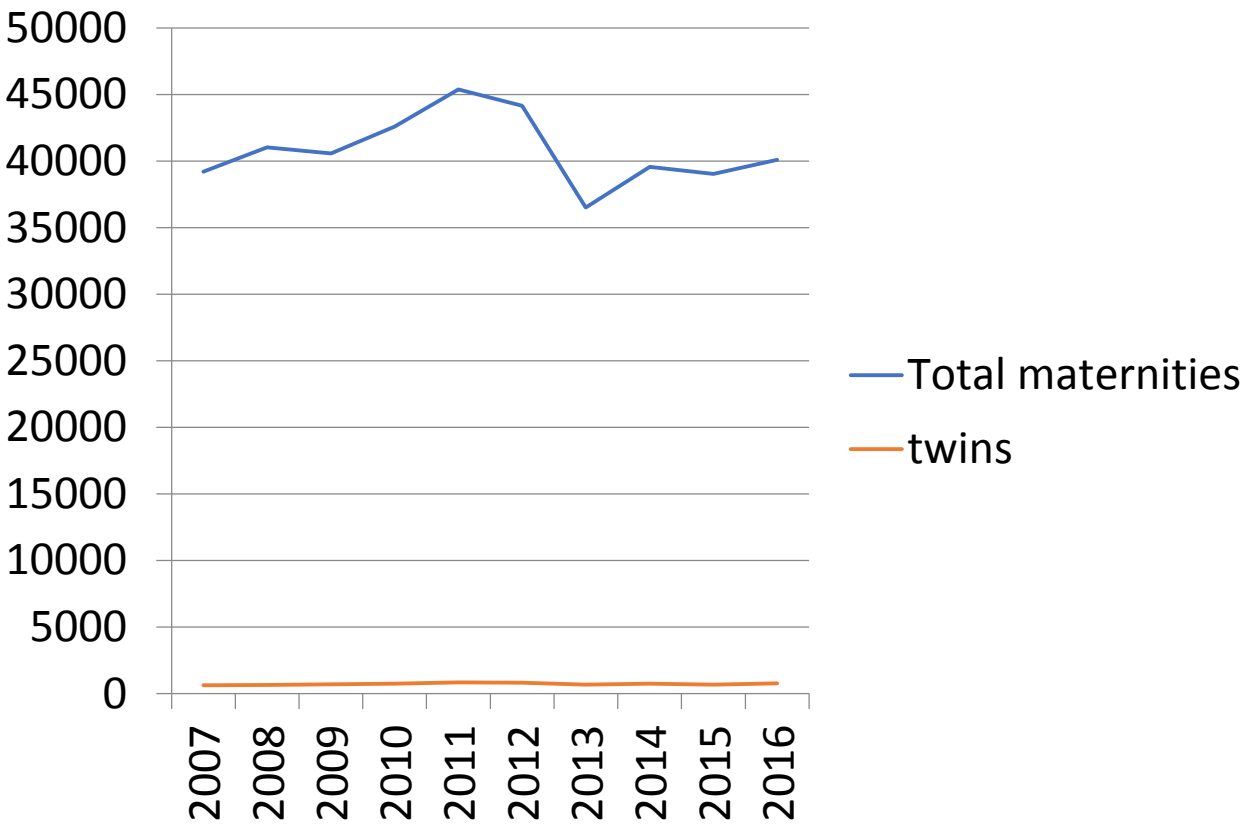
Improved Management of Multiple pregnancy

Dr WC Leung, MD

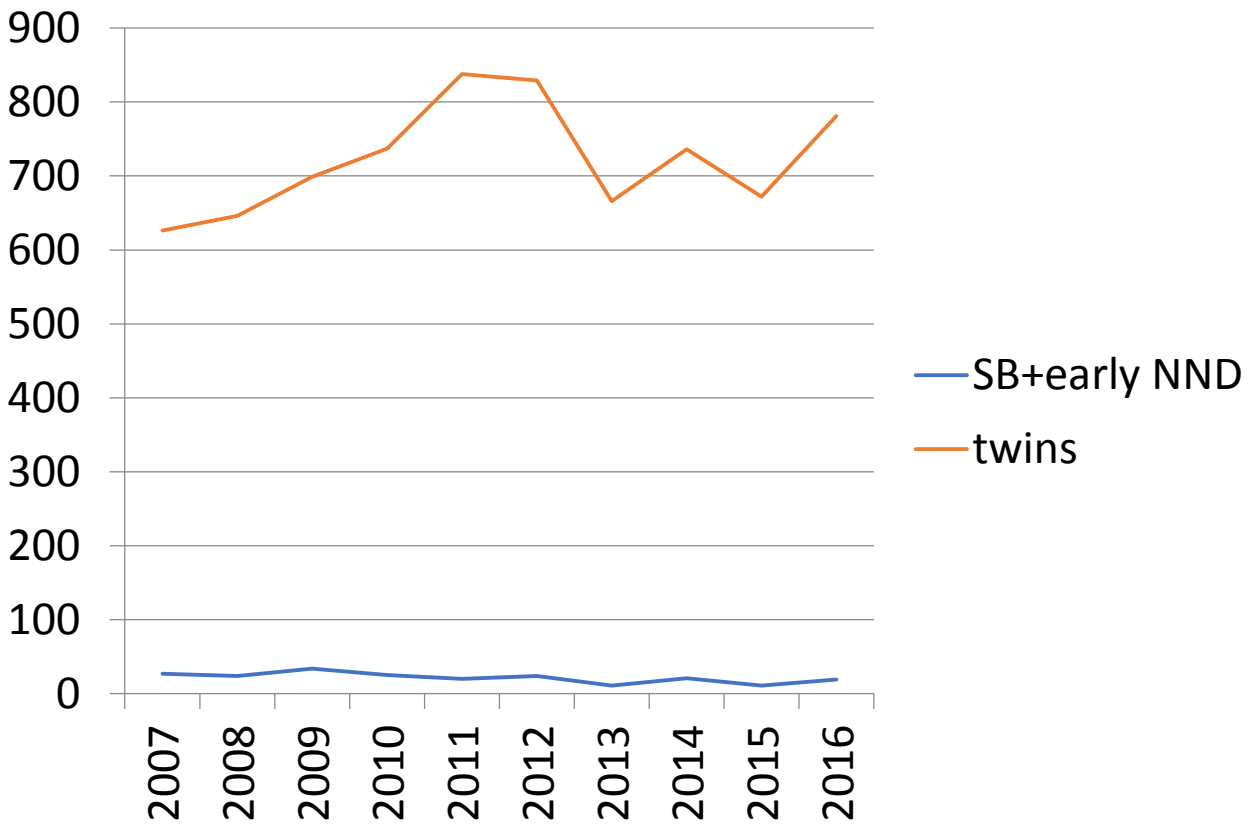
KWH Maternal Fetal Medicine (MFM) Team

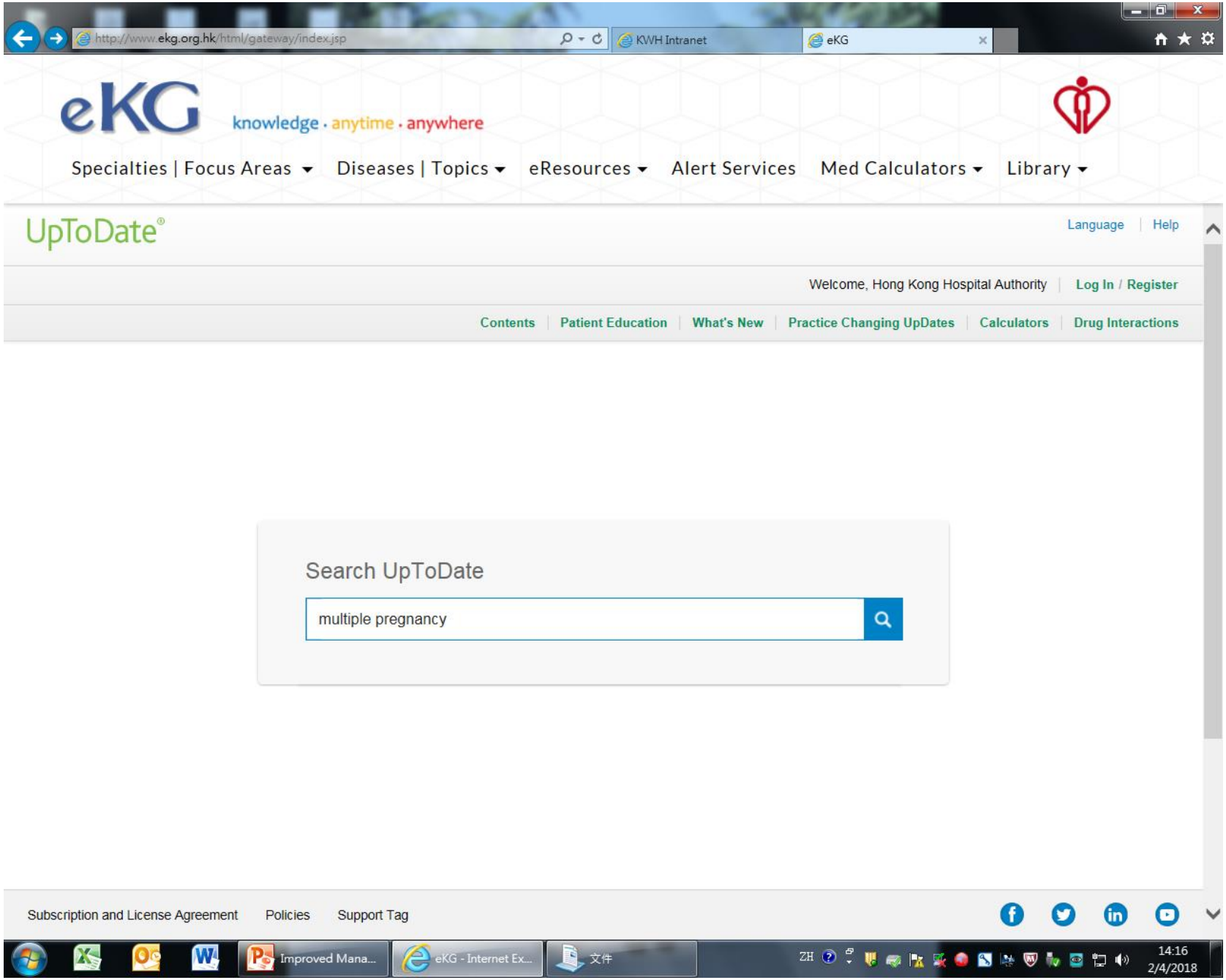
HA Convention 2018

HA Statistics 2007 to 2016 (10 years)



HA Statistics 2007 to 2016 (10 years)
Twins

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KWH Intranet
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Specialties | Focus Areas
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Alert Services
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Patient Education
What's New
Practice Changing UpDates
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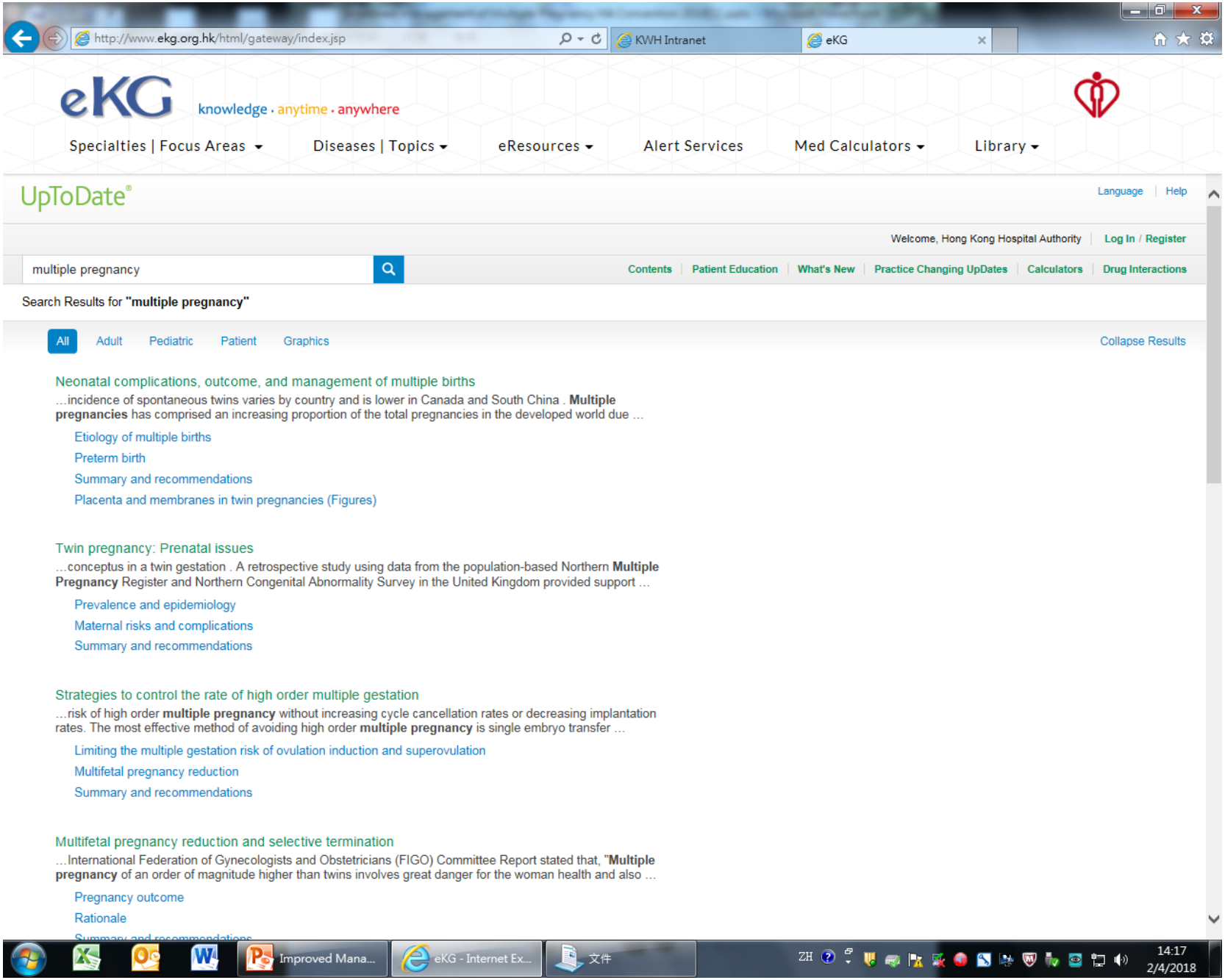
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KWH Intranet
eKG
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knowledge · anytime · anywhere
Specialties | Focus Areas
Diseases | Topics
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Alert Services
Med Calculators
Library
UpToDate
Language
Help
Welcome, Hong Kong Hospital Authority
Log In / Register
multiple pregnancy
Contents
Patient Education
What's New
Practice Changing UpDates
Calculators
Drug Interactions
Search Results for "multiple pregnancy"
All
Adult
Pediatric
Patient
Graphics
Collapse Results
Neonatal complications, outcome, and management of multiple births
...incidence of spontaneous twins varies by country and is lower in Canada and South China . Multiple pregnancies has comprised an increasing proportion of the total pregnancies in the developed world due ...
Etiology of multiple births
Preterm birth
Summary and recommendations
Placenta and membranes in twin pregnancies (Figures)
Twin pregnancy: Prenatal issues
...conceptus in a twin gestation . A retrospective study using data from the population-based Northern Multiple Pregnancy Register and Northern Congenital Abnormality Survey in the United Kingdom provided support ...
Prevalence and epidemiology
Maternal risks and complications
Summary and recommendations
Strategies to control the rate of high order multiple gestation
...risk of high order multiple pregnancy without increasing cycle cancellation rates or decreasing implantation rates. The most effective method of avoiding high order multiple pregnancy is single embryo transfer ...
Limiting the multiple gestation risk of ovulation induction and superovulation
Multifetal pregnancy reduction
Summary and recommendations
Multifetal pregnancy reduction and selective termination
...International Federation of Gynecologists and Obstetricians (FIGO) Committee Report stated that, "Multiple pregnancy of an order of magnitude higher than twins involves great danger for the woman health and also ...
Pregnancy outcome
Rationale
Improved Mana...
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Fetal and infant death rates in twin gestations (both fetuses alive at 20 weeks of gestation, n=150,386)

Outcome	Percent
Two surviving infants	93.7
One infant death, one surviving infant	2.3
Two infant deaths	1.5
One fetal death, one surviving infant	1.1
Two fetal deaths	1.1
One fetal death, one infant death	0.4

Based upon the Matched Multiple Birth File from the US National Center for Health Statistics. Adapted from Johnson CD, Zhang J. Obstet Gynecol 2002; 99:698.

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Infant, neonatal, postnatal mortality per 1000 live births by plurality

	Infant deaths (birth to 1 year)	Neonatal deaths (birth to day 28)	Postneonatal (day 29 to 1 year)
Singletons	11.2	7.8	3.4
Twins	66.4	55.9	10.5
Triplets*	190.4	168.8	21.6

* Triplets and higher order multiple gestations.

Calculated from US Vital Statistics, 1998 and from US Public Health Service. Healthy People 2000: National Health Promotion and Disease Prevention Objectives, DHHS Pub. No. (PHS)90-50212. Washington, DC: US Department of Health and Human Services, Public Health Service; 1990.

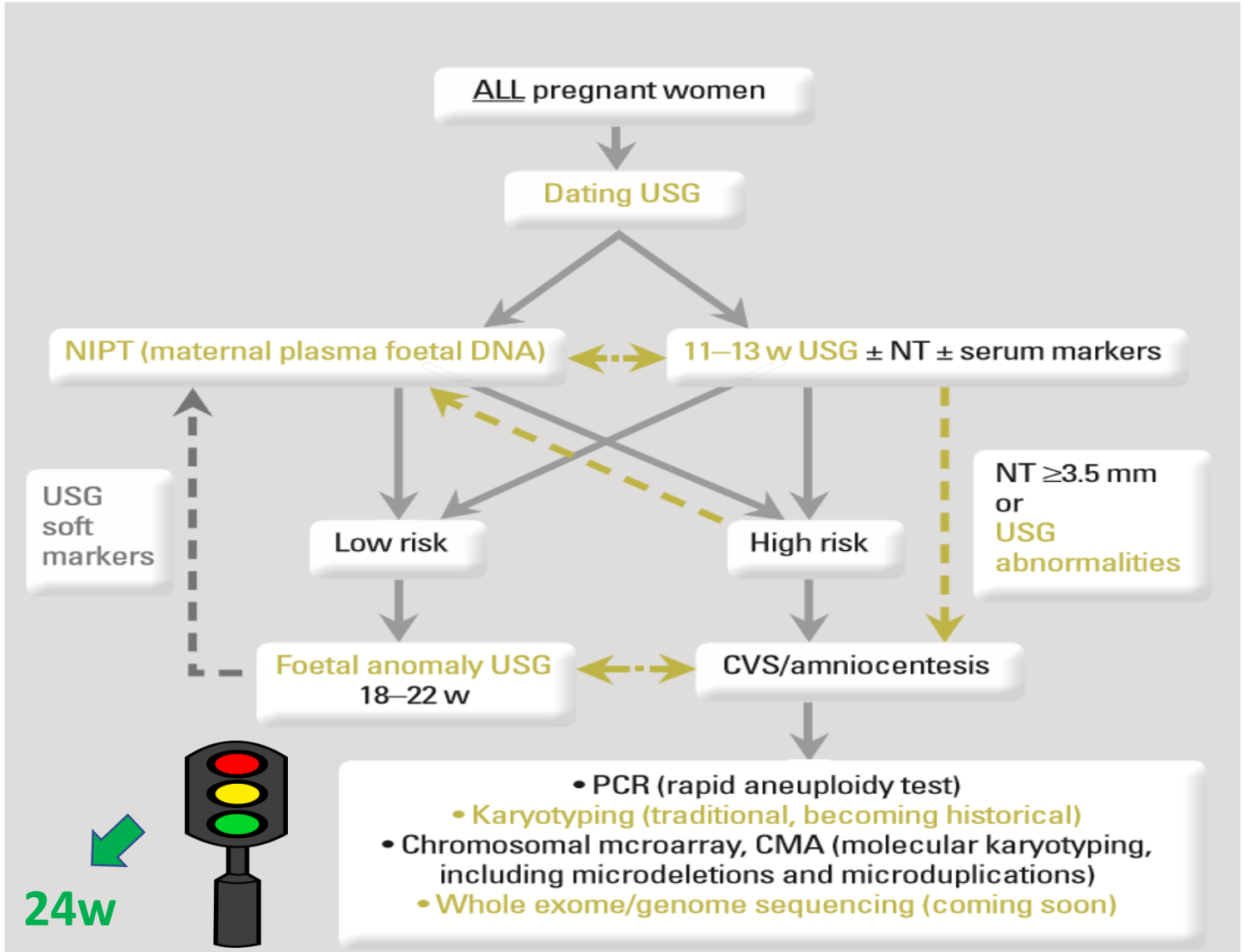
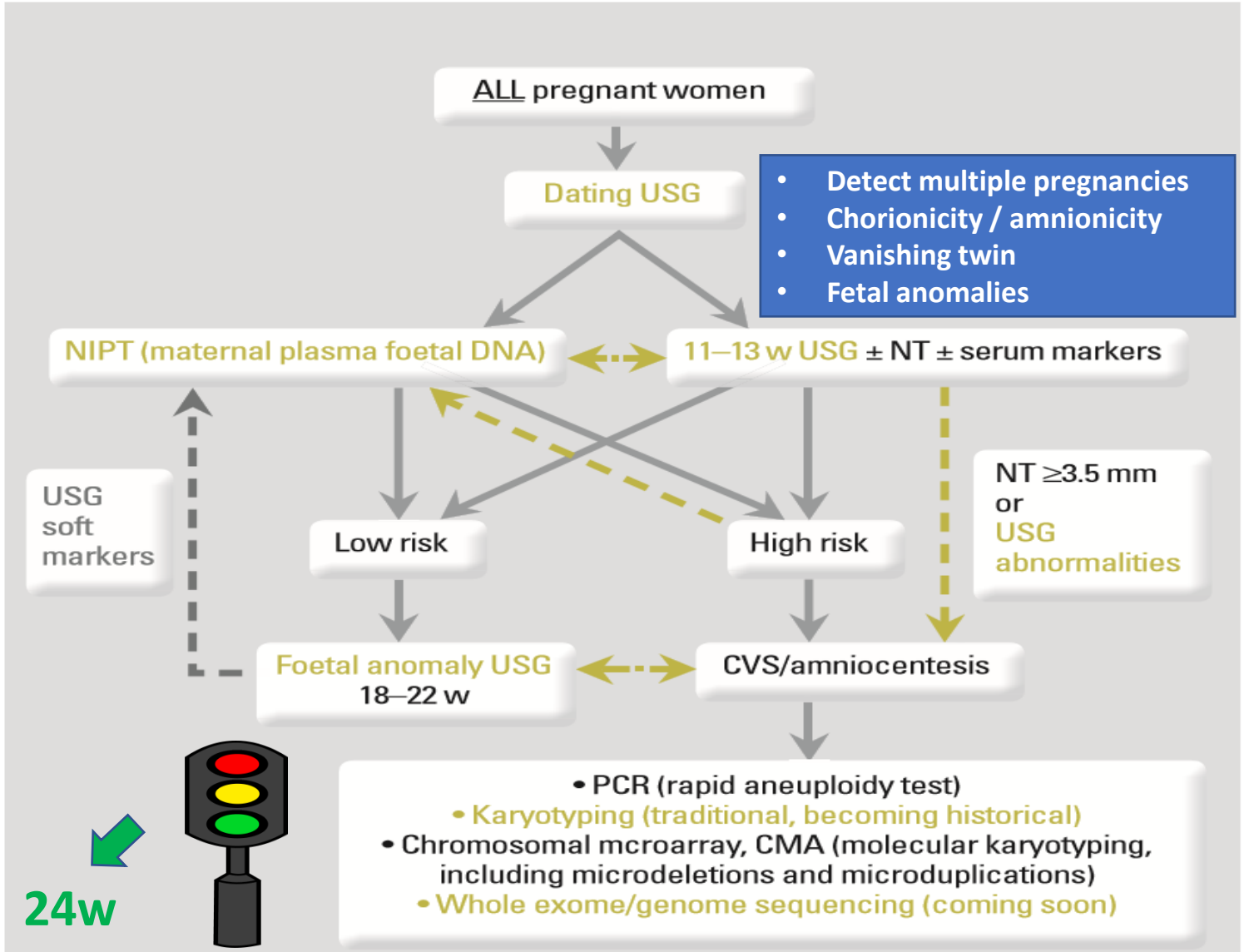


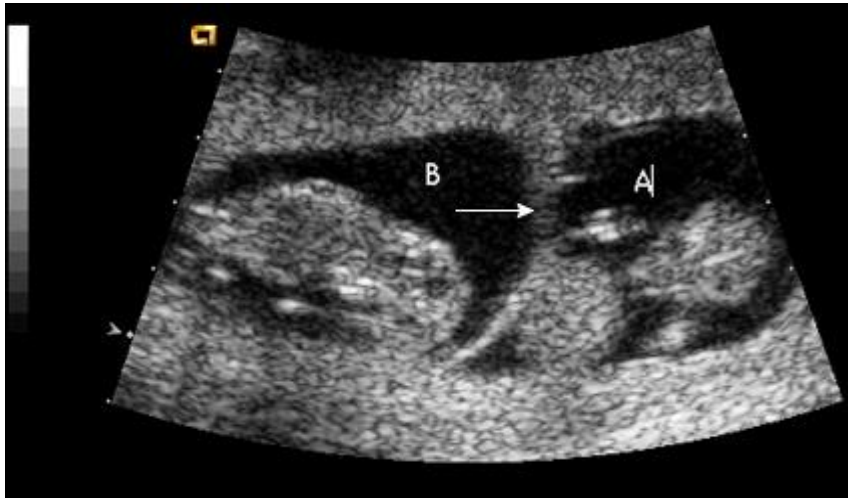
Figure 1. New Algorithms in Prenatal Diagnosis 2017



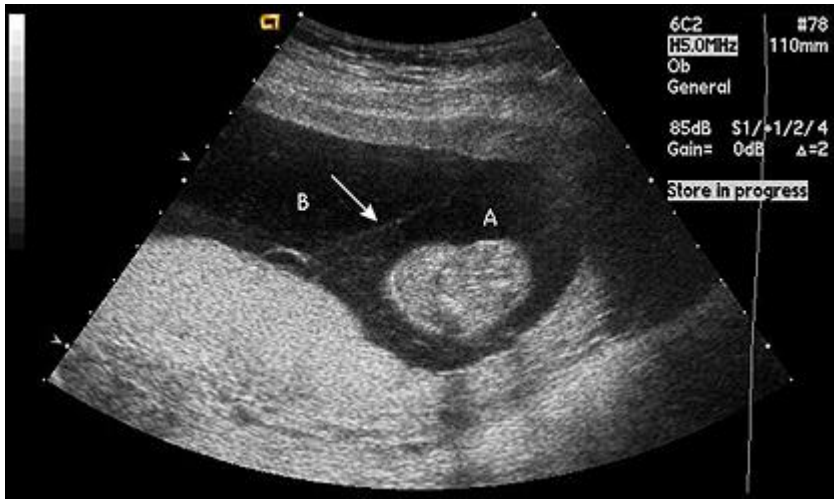
Abbreviations: USG = ultrasonogram. NIPT = noninvasive prenatal testing. NT = nuchal translucency. CVS = chorionic villus sampling. PCR = polymerase chain reaction.

Figure 1. New Algorithms in Prenatal Diagnosis 2017

Twin peak or lambda sign (DCDA)

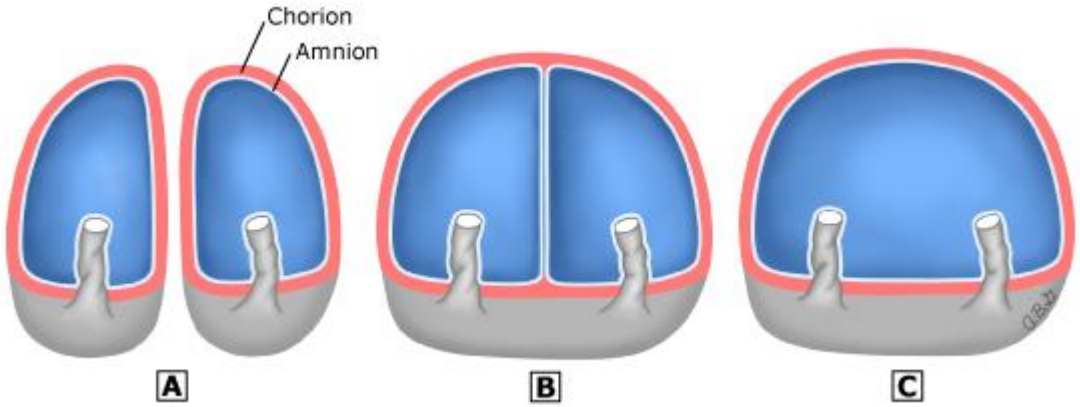


Thick intertwin membrane (DCDA)



Monochorionic diamniotic (MCDA) pregnancy

Placenta and membranes in twin pregnancies



DCDA

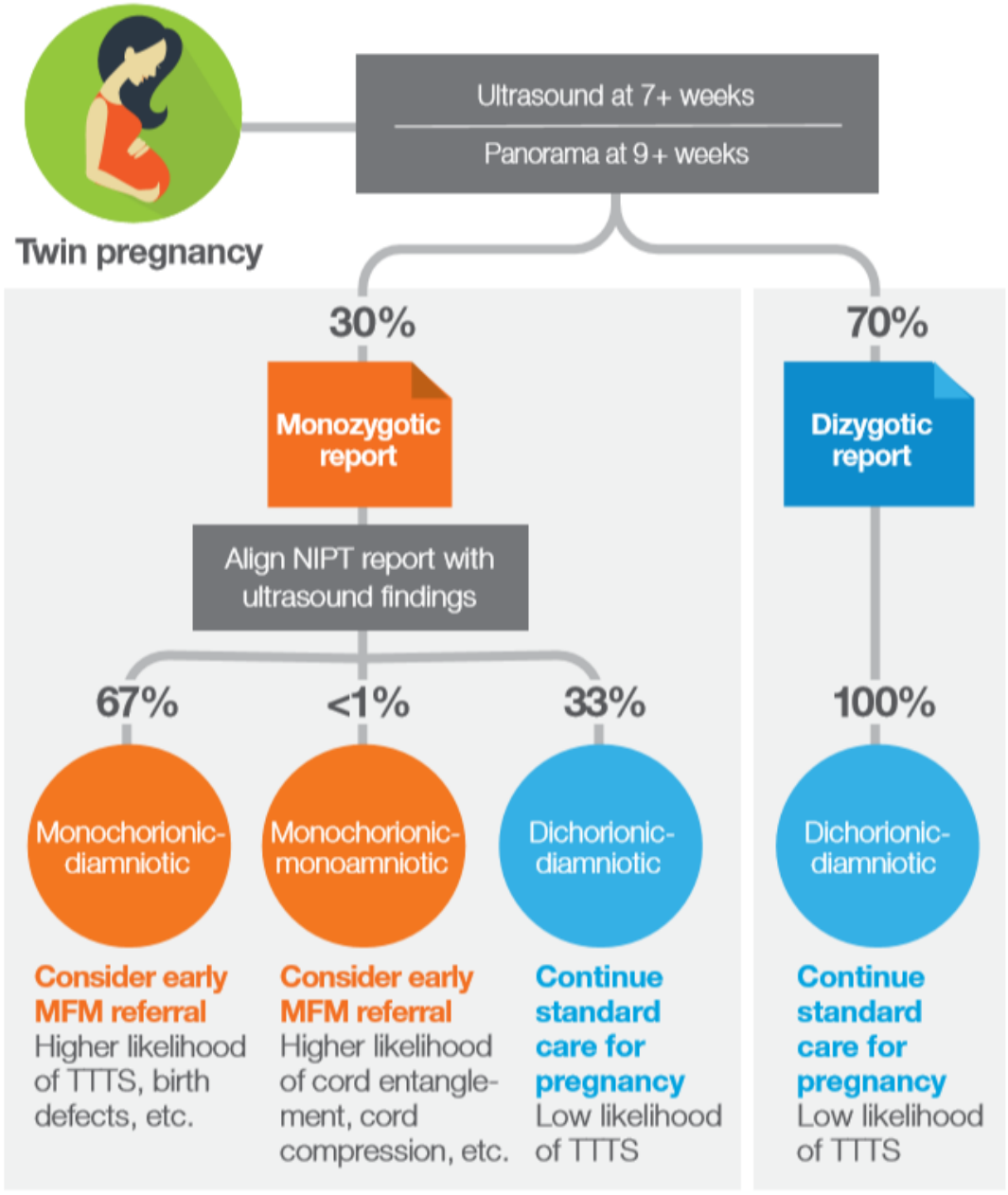
MCDA

- TTTS (10-15%)
- TAPS
- TRAP
- sIUGR

MCMA

- Cord entanglement
- Conjoined twins

NIPT


Twin pregnancy
Ultrasound at 7+ weeks
Panorama at 9+ weeks
30%
70%
Monozygotic report
Dizygotic report
Align NIPT report with ultrasound findings
67%
<1%
33%
100%
Monochorionic-diamniotic
Monochorionic-monoamniotic
Dichorionic-diamniotic
Dichorionic-diamniotic
Consider early MFM referral
Higher likelihood of TTTS, birth defects, etc.
Consider early MFM referral
Higher likelihood of cord entanglement, cord compression, etc.
Continue standard care for pregnancy
Low likelihood of TTTS
Continue standard care for pregnancy
Low likelihood of TTTS

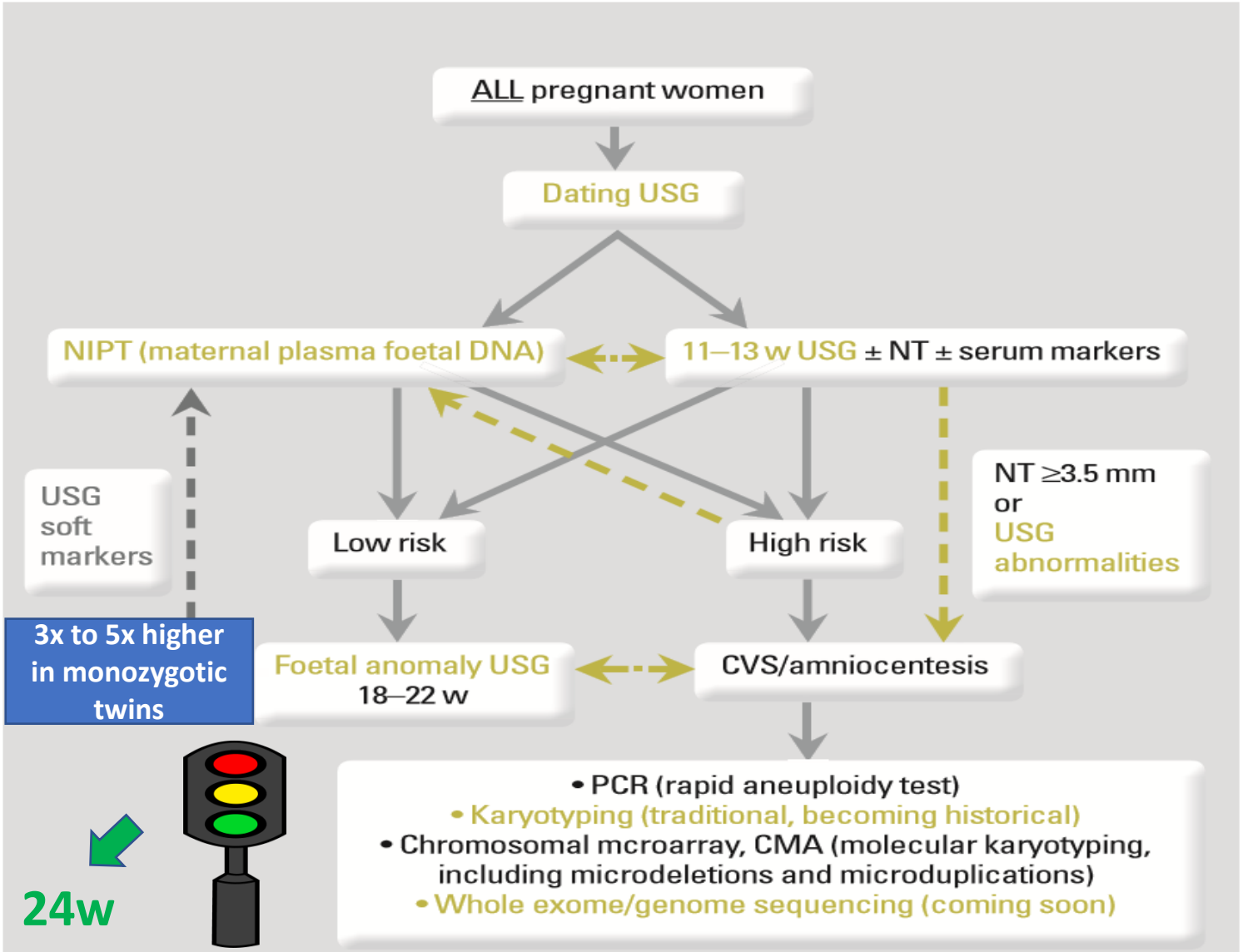
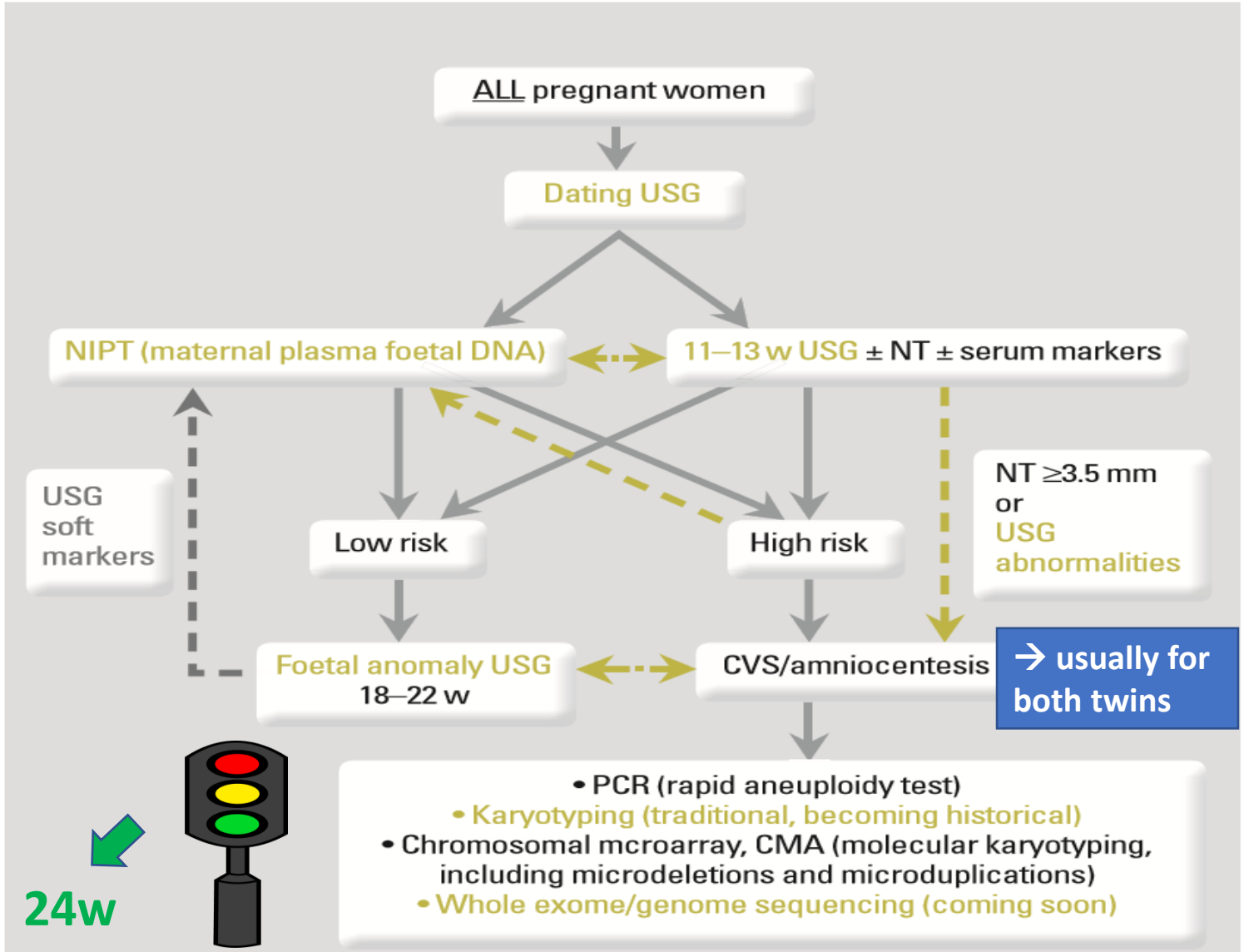


Figure 1. New Algorithms in Prenatal Diagnosis 2017



Abbreviations: USG = ultrasonogram. NIPT = noninvasive prenatal testing. NT = nuchal translucency. CVS = chorionic villus sampling. PCR = polymerase chain reaction.

Figure 1. New Algorithms in Prenatal Diagnosis 2017

Fetal Diagn Ther. 2009;25(4):397-9. doi: 10.1159/000236153. Epub 2009 Sep 30.

Monozygotic dichorionic twins heterokaryotypic for duplication chromosome 2q13-q23.3.

Leung WC[1], Choi H, Lau WL, Ng LK, Lau ET, Lo FM, Choy KW, Lau TK, Tang MH, Chin R.

Author information

Abstract

We present an evaluation of the diagnosis, management and outcome of a pair of heterokaryotypic monozygotic dichorionic twins. The heterokaryotype was an incidental finding from an amniocentesis performed for prenatal diagnosis of beta-thalassaemia major in a pair of dichorionic twins. Monozygocity was revealed by QF-PCR showing identical short tandem repeat markers on chromosomes 21, 18, 13, X and Y. The twins were heterokaryotypic for duplication chromosome 2q13-q23.3, as shown by array comparative genomic hybridization. Selective foeticide was performed. This case demonstrates that heterokaryotypic monozygotic dichorionic twins are a genetic possibility that does occur.

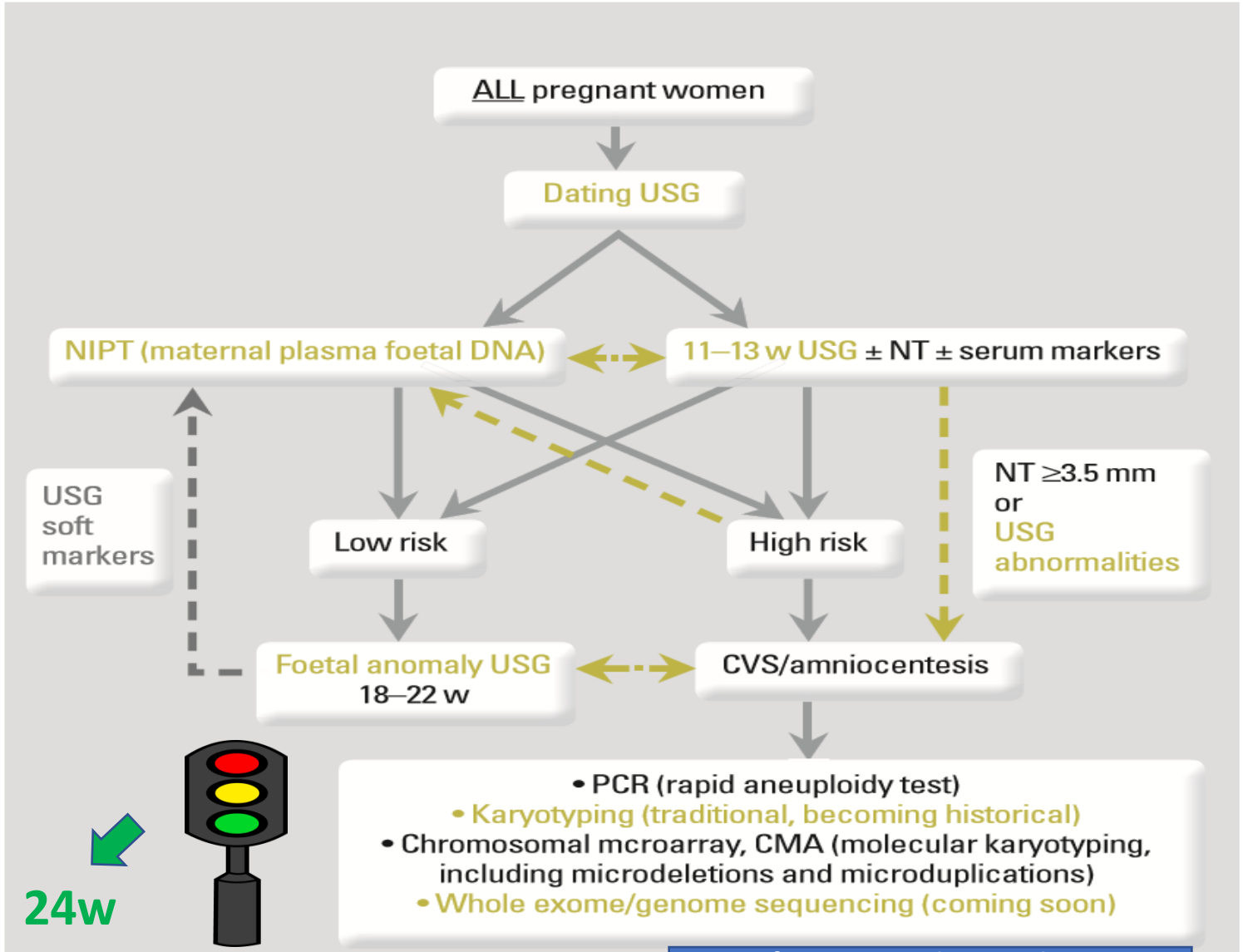
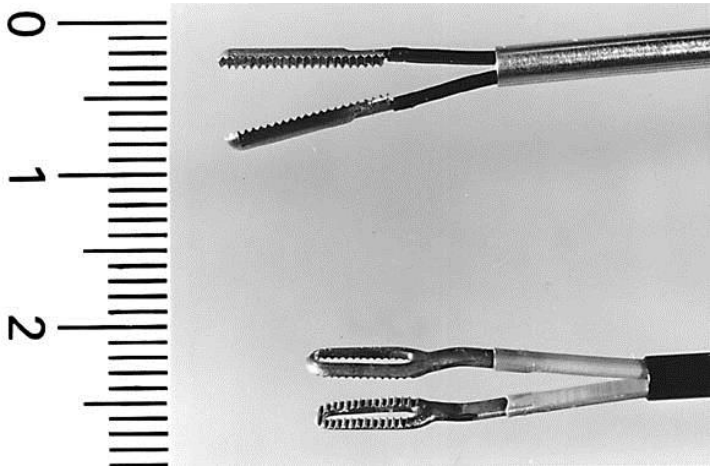
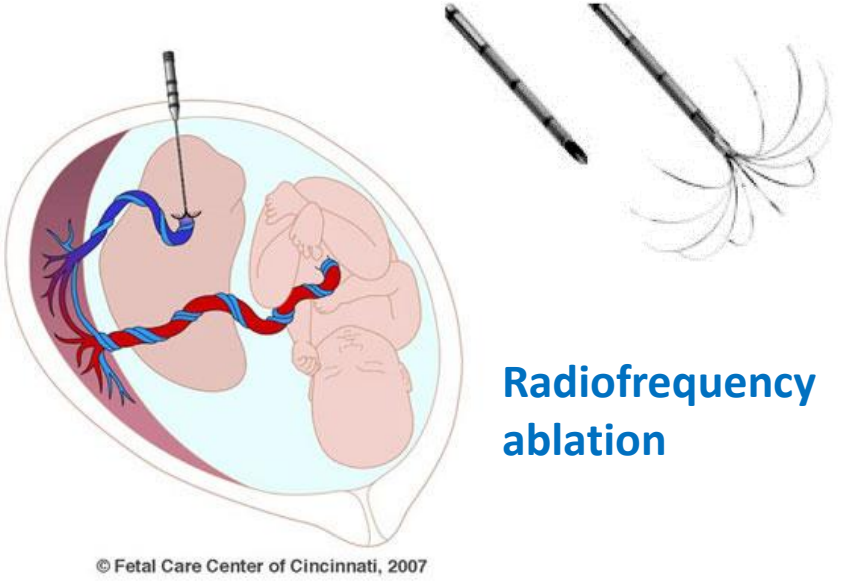


Figure 1. New Algorithms in Prenatal Diagnosis 2017

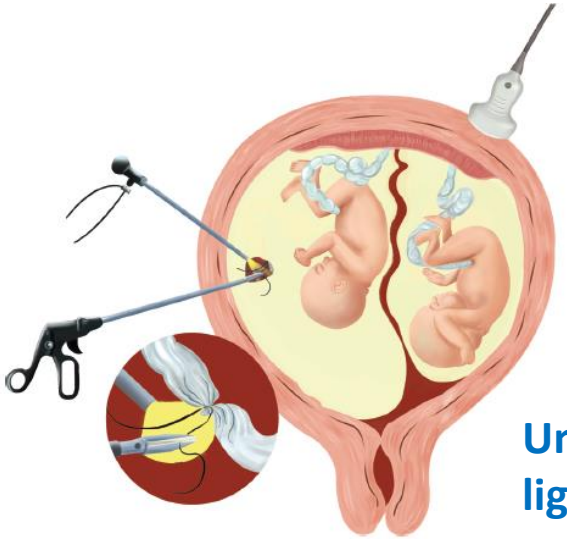
Intracardiac KCl injection (also for MFPR)



Bipolar cord coagulation



Radiofrequency ablation



Umbilical cord ligation

KWH Protocol on Management of Multiple Pregnancy

Updated 2012

<table>
<tr><td colspan="5">Dating + chorionicity +/- nuchal scan for Down's screening (best before 14 weeks)</td></tr>
<tr><td>DCDA</td><td colspan="2">MC
(MCDA, MCMA)</td><td colspan="2">Higher multiple</td></tr>
<tr><td>Monthly scan + FU incl anomaly scan at 18-20 week +/- cervical length/ uterine Doppler at 22-23 week</td><td colspan="2">2 weekly scan + FU to monitor for signs of TTTS from 16 to 30 weeks, and incl anomaly scan at 18-20 weeks +/- cervical length/ uterine Doppler at 22-23 week</td><td colspan="2">Discuss fetal reduction

MFPR</td></tr>
<tr><td rowspan="2"></td><td>MCDA</td><td>MCMA</td><td rowspan="2">MC/DC protocol (if reduced to twins)</td><td rowspan="2">Refer out to other unit if remains high multiple pregnancy</td></tr>
<tr><td>If no growth discrepancy, monthly scan from 30 weeks onwards</td><td>- steroid at 32 weeks
- consider delivery after 32 weeks</td></tr>
</table>

Diagnostic criteria for twin-twin transfusion syndrome

- Single monochorionic placenta
- Polyhydramnios/oligohydramnios sequence
  - Before 20 weeks of gestation, the maximum vertical pockets for oligohydramnios and polyhydramnios are <2 cm and >8 cm, respectively
  - After 20 weeks, the maximum vertical pocket for polyhydramnios is defined as >10 cm

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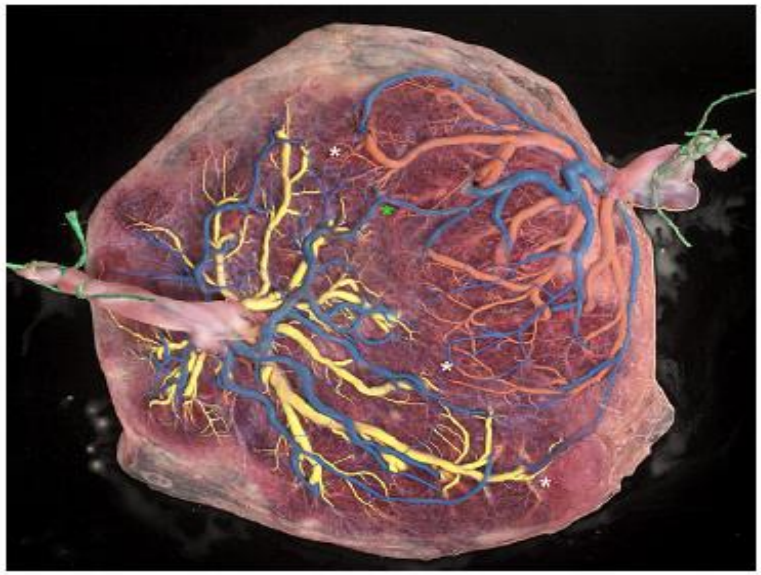

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Endoscopic Laser Surgery versus Serial Amnioreduction for Severe Twin-to-Twin Transfusion Syndrome

Marie-Victoire Senat, M.D., Jan Deprest, M.D., Ph.D., Michel Boulvain, M.D., Ph.D., Alain Paupe, M.D., Norbert Winer, M.D., and Yves Ville, M.D.

Diagnostic criteria for twin anemia-polycythemia sequence

Fetal criteria ▪ MCA-PSV >1.50 MoM in the donor and MCA-PSV <0.80 MoM in the recipient
Neonatal criteria ▪ Intertwin hemoglobin difference >8.0 g/dL and intertwin reticulocyte count ratio (donor/recipient) >1.7

MCA-PSV: middle cerebral artery peak systolic velocity; MoM: multiples of the median.

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Diagnosis and classification of selective fetal growth restriction in monochorionic twins

Diagnosis: Estimated weight of one twin below the 10th percentile or discordance in estimated twin weights greater than 25 percent

Type 1: Normal/positive Doppler flow in the umbilical artery

- Mild intertwin weight discordance
- Usually favorable outcome for both twins: Very low risk of fetal demise of growth-restricted twin

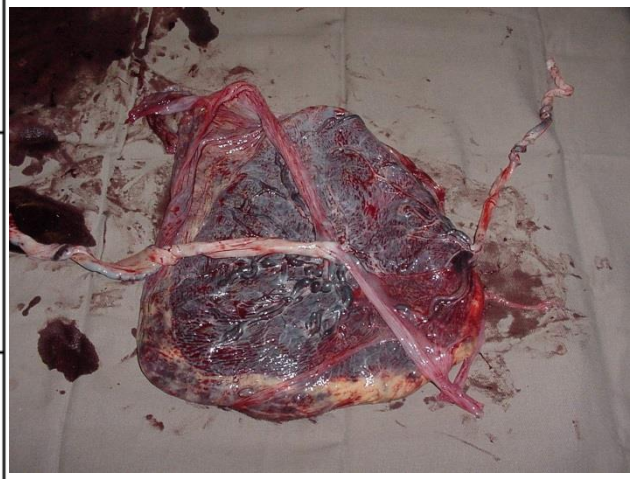
Type 2: Absent/reversed end-diastolic flow in the umbilical artery

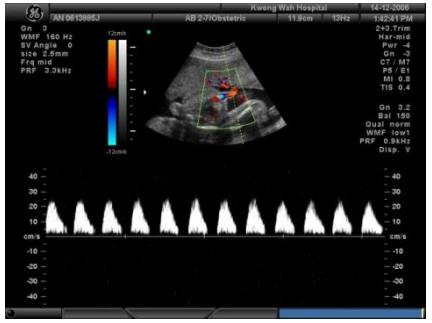
- Poorest prognosis: High risk of fetal demise of growth-restricted twin
- Mean gestational age at delivery: 29 weeks of gestation

Type 3: Intermittent absent/reversed end-diastolic flow in the umbilical artery

- Intermediate prognosis: 10 to 15 percent risk of fetal demise of growth-restricted twin
- Commonly survive to 32 weeks or more of gestation

Data from: Gratacos E, Ortiz JU, Martinez JM. A systematic approach to the differential diagnosis and management of the complications of monochorionic twin pregnancies. Fetal Diagn Ther 2012; 32:145.





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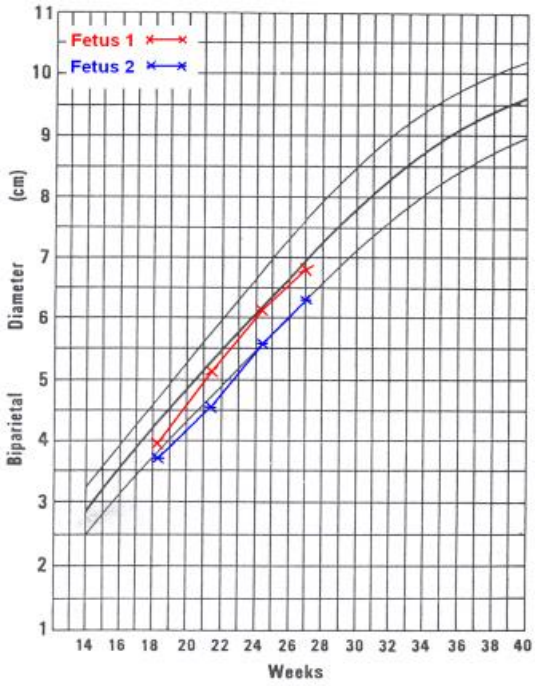
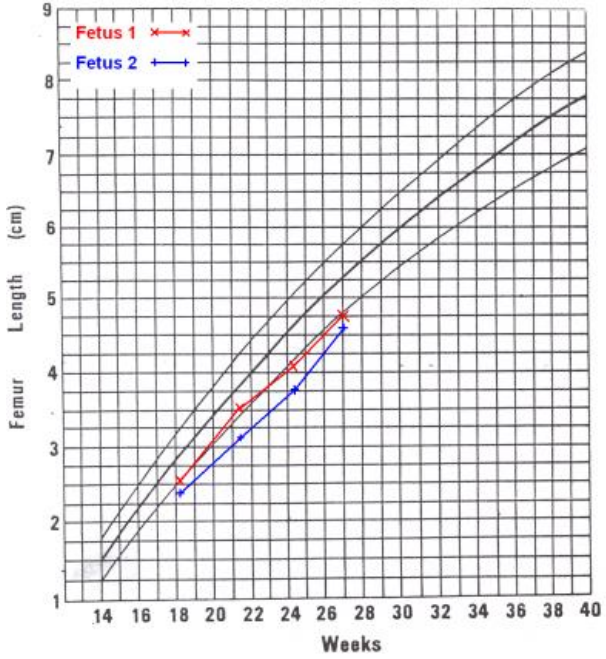
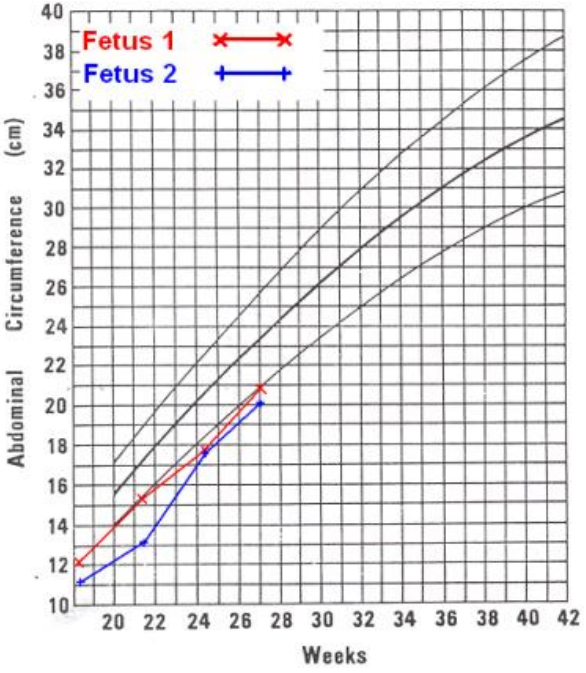
Twin pregnancy is associated with higher rates of almost every pregnancy complication, with the exception of postdate & macrosomia:

Fetal –

- **IUGR**
- **Congenital anomalies**
- **Preterm delivery (Progesterone X; bedrest X; Cerclage X; Tocolytics X; Pessary X)**
  - **Antenatal corticosteroids (same dosage regime as singletons)**
  - **MgSO4 to reduce the severity & risk of cerebral palsy**
- **Death of one twin (→ neurodevelopmental impairment of the co-twin 25% in monochorionic twins & 2% in dichorionic twins)**


Fetus 1
Fetus 2
Biparietal Diameter (cm)
11
10
9
8
7
6
5
4
3
2
1
14 16 18 20 22 24 26 28 30 32 34 36 38 40
Weeks


Fetus 1
Fetus 2
Femur Length (cm)
9
8
7
6
5
4
3
2
1
14 16 18 20 22 24 26 28 30 32 34 36 38 40
Weeks


Fetus 1
Fetus 2
Abdominal Circumference (cm)
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
20 22 24 26 28 30 32 34 36 38 40 42
Weeks

Gestational age and birthweight characteristics of United States singleton, twin, and triplet live births, 2006

	Singletons	Twins	Triplets
No. of births	4,121,930	137,085	6118
Mean gestational age (weeks)	38.7	35.2	32.0
Percent very preterm (<32 weeks)	1.6	12.1	36.3
Percent preterm (<37 weeks)	11.1	60.4	92.6
Birthweight (grams)	3298	2323	1655
Percent very low birthweight (<1500 grams)	1.1	10.2	34.8
Percent low birthweight (<2500 grams)	6.5	57.5	95.4

Adapted from: Martin JA, Hamilton BE, Sutton PD, et al. Births: final data for 2006. Natl Vital Stat Rep 2009; 57:1.

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Prediction of preterm birth before 32 weeks of gestation in twins by sonographically determined cervical length

Cut-off for cervical length (mm)	Sensitivity (percent)	Specificity (percent)	PPV (percent)	NPV (percent)
Assessment at 21 to 24 weeks of gestation				
20	42	85	22	94
25	54	86	27	95
30	46	89	19	97
Assessment at 25 to 28 weeks of gestation				
20	56	76	16	95
25	63 to 100	70 to 84	13 to 18	96 to 100

PPV: positive predictive value; NPV: negative predictive value.

Data adapted from:

1. Goldenberg RL, Iams JD, Miodovnik M, et al. The preterm prediction study: risk factors in twin gestations. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Am J Obstet Gynecol 1996; 175:1047.

2. Guzman ER, Walters C, O'Reilly-Green C, et al. Use of cervical ultrasonography in prediction of spontaneous preterm birth in twin gestations. Am J Obstet Gynecol 2000; 183:1103.

3. Vayssiere C, Favre R, Audibert F, et al. Cervical length and funneling at 22 and 27 weeks to predict spontaneous birth before 32 weeks in twin pregnancies: a French prospective multicenter study. Am J Obstet Gynecol 2002; 187:1596.

Twin pregnancy is associated with higher rates of almost every pregnancy complication, with the exception of postdate & macrosomia:

Maternal –

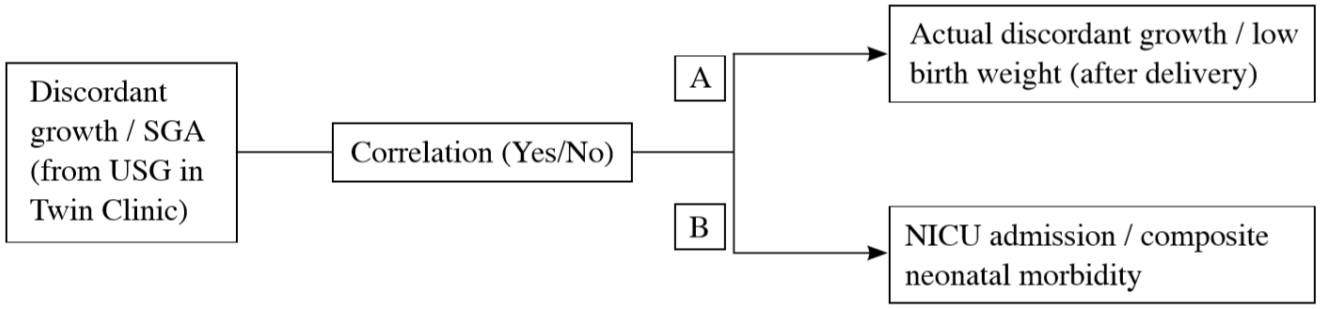
- **Gestational hypertension & preeclampsia**
- **Gestational diabetes**
- **Acute fatty liver (rare)**
- **Others – PUPPP (skin), intrahepatic cholestasis of pregnancy, Fe deficiency anaemia, hyperemesis gravidarum, thromboembolism**

A Specialised Twin Pregnancy Clinic in a Public Hospital

WK YUNG MBBS, MRCOG, FHKAM (O&G)
AL LIU MBBS, MRCOG
SF LAI MBBS
MT LAM MBBS
HN YEUNG MBBS, MRCOG, FHKAM (O&G)
FK LAI BSc (N), MSSc
TK LO MBBS, MRCOG, FHKAM (O&G)
WL LAU MBBS, FRCOG, FHKAM (O&G)
WC LEUNG MBBS, MD, FRCOG, FHKAM (O&G), Cert RCOG (Maternal and Fetal Med)
Department of Obstetrics and Gynaecology, Kwong Wah Hospital, 25 Waterloo Road, Kowloon, Hong Kong

Specialized antenatal clinics for multiple pregnancy have not been proven to improve birth outcomes vs. standard care
Cochrane Database Syst Rev 2012

Objectives: To evaluate the pregnancy outcomes in a 3-year cohort of twin pregnancies managed in a specialised clinic, and propose performance indicators for such a 'twin clinic'.
Methods: Prospective data analysis was performed on all the twin pregnancies referred to the twin clinic in Kwong Wah Hospital from 1 April 2006 to 31 March 2009. The specialist clinic and delivery protocol was described. A total of 215 twin pregnancies were identified from the booking system; 207 records were reviewed. Of these, 136 dichorionic diamniotic and 68 monochorionic diamniotic pregnancies were analysed for their characteristics, complications, and maternal and neonatal outcomes. Multivariate analysis was used to identify the risk factors for adverse neonatal outcomes.
Results: Apart from twin-twin transfusion syndrome, chorionicity did not account for differences in pregnancy characteristics, pregnancy complications, and maternal, fetal or neonatal outcomes. Growth discordance greater than 25% on antenatal ultrasound predicted neonatal intensive care unit admission (11.7% vs. 47.5%; p=0.011), composite neonatal morbidity (36.9% vs. 65.0%; p=0.010), low birth weight corrected for gestation (25.8% vs. 45.0%; p=0.001), and prematurity before 37 weeks of gestation (40.3% vs. 65.0%; p=0.006), 34 weeks of gestation (8.1% vs. 30.0%; p=0.003) and 32 weeks of gestation (2.7% vs. 15.0%; p=0.022). Small-for-gestational age on antenatal ultrasound only predicted neonatal intensive care unit admission (13.2% vs. 29.8%; p=0.028). Further analysis on actual birth weight discordance greater than 25% and low birth weight after delivery reinforced its correlation with adverse neonatal outcomes. In Kwong Wah Hospital, sonographic prediction of birth weight discordance greater than 25% had a sensitivity of 73.3%, specificity of 94.1%, positive predictive value of 55.0%, and negative predictive value of 97.3%.
Conclusion: Birth weight discordance and low birth weight are the established risk factors of neonatal morbidity and mortality. As these two parameters could be predicted with reasonable accuracy by means of antenatal ultrasound, we propose 'prediction of birth weight discordance or low birth weight by antenatal ultrasound with positive correlation to adverse neonatal outcomes' to be the potential performance indicator for a specialised clinic managing twin pregnancies.
Hong Kong J Gynaecol Obstet Midwifery 2012; 12:21-32



Four possible scenarios	A	B	Implications on Twin Clinic performance
1	Yes	Yes	Useful, as USG correctly predicts growth discordance / LBW and this is the proven high-risk group of adverse neonatal outcome
2	Yes	No	Unlikely to happen in real situation as growth discordance and LBW are the established risk factors for adverse neonatal outcome. Advise to evaluate clinical management of newborn or documentation of neonatal outcome
3	No	Yes	Potentially harmful as unnecessary intervention increases neonatal morbidity (i.e. prematurity)
4	No	No	Not useful

Abbreviations: SGA = small-for-gestational age; USG = ultrasonography; NICU = neonatal intensive care unit; LBW = low birth weight

Figure 2. Algorithm to assess the performance of a Twin Clinic

1.4. Mode of delivery

- uncomplicated DCDA or MCDA twin pregnancy
  - if first twin is in cephalic presentation, vaginal delivery is an option
  - if first twin is in non-cephalic presentation, Caesarean section is preferred.
  - Triplet or higher multiple pregnancy (should have referred to other units)

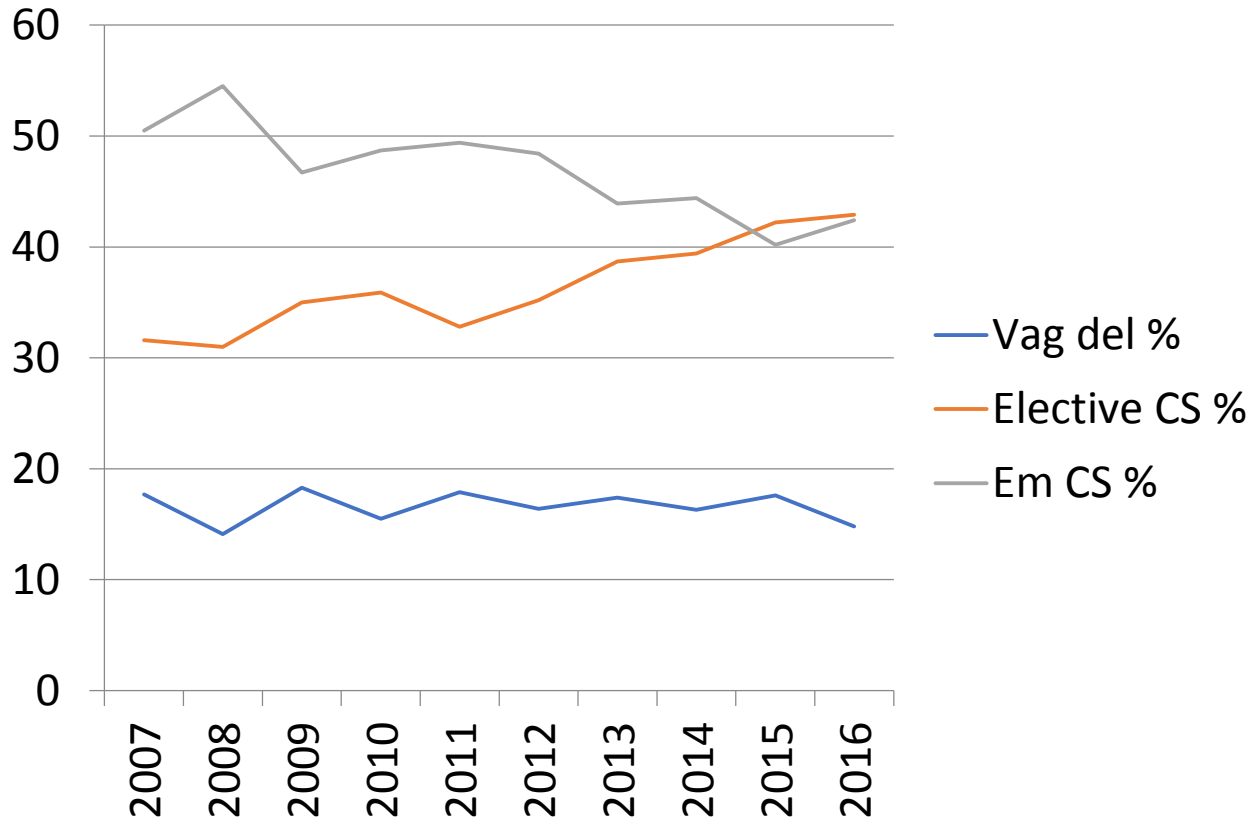
KWH Protocol on Management of Multiple Pregnancy

Updated 2012

1.5. Timing of delivery

- for uncomplicated DCDA twins, planned delivery at 37-38 week
- for uncomplicated MCDA twins, planned delivery at 36-37 week
- for MCMA twins, give steroid at 32 weeks and consider delivery after 32 weeks

HA Statistics 2007 to 2016 (10 years)
Twins



Hong Kong Med J. 2012 Apr;18(2):99-107.

Factors influencing the mode of delivery and associated pregnancy outcomes for twins: a retrospective cohort study in a public hospital.

Liu AL[1], Yung WK, Yeung HN, Lai SF, Lam MT, Lai FK, Lo TK, Lau WL, Leung WC.

Author information

Abstract

OBJECTIVES: To determine current trends for different modes of delivery in twin pregnancies, factors affecting the mode of delivery, and associated outcomes.

DESIGN: Retrospective cohort study.

SETTING: A public hospital in Hong Kong.

PARTICIPANTS: All twin pregnancies booked at Kwong Wah Hospital during a 3-year period from 1 April 2006 to 31 March 2009.

RESULTS: Of 197 sets of twins, 35 (18%) were delivered vaginally and 162 (82%) by caesarean section (47% were emergencies and 53% elective). In all, 32 (37%) of the elective and 21 (28%) of the emergency caesarean sections were in response to maternal requests. Vaginal delivery was more common in mothers with a history of vaginal delivery and monochorionic diamniotic twins. Women who conceived by assisted reproduction or those who had a tertiary education were more likely to deliver by caesarean section. The type of conception and the presentation of the second twin were statistically significant factors affecting maternal choice on the mode of delivery. Maternal age did not affect the choice of delivery mode. Except for the higher frequency of sepsis and cord blood acidosis in second twins delivered vaginally, there were no significant differences in neonatal morbidity between the groups that attempted vaginal delivery or requested caesarean sections. All the women who had compression sutures or hysterectomy to control massive postpartum haemorrhage were delivered by caesarean section.

CONCLUSION: A high caesarean section rate observed in our cohort was associated with maternal requests for this mode of delivery. The type of conception and the presentation of the second twin were statistically significant factors affecting maternal choice on mode of delivery. Women's requests for caesarean delivery out of the concern for their babies are not supported by current evidence. In response to a woman with a twin pregnancy requesting caesarean delivery, the pros and cons of vaginal deliveries and caesarean sections should be fully explained before the woman's autonomy is respected.

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The Mode of Delivery for Twin Pregnancy

01 Oct 2015

About the Authors

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The Mode of Delivery for Twin Pregnancy

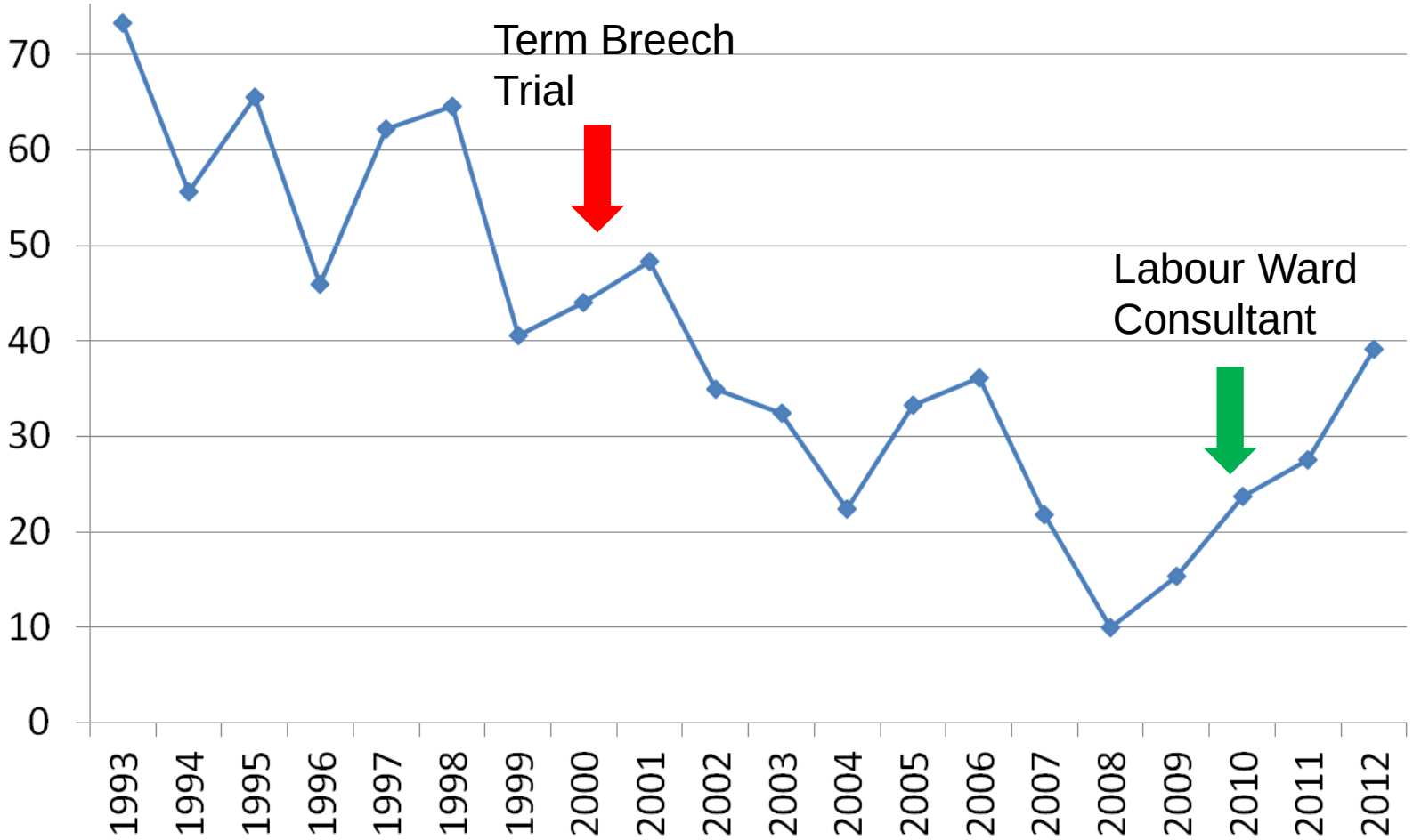
Int J Gynaecol Obstet. 2014 Jul;126(1):96-7. doi: 10.1016/j.ijgo.2014.01.009. Epub 2014 Mar 19.

Rebound increase in vaginal delivery for twins in a regional obstetric unit in Hong Kong.

Tang HT[1], Liu AL[2], Yung WK[2], Lo TK[2], Lau WL[2], Leung WC[2].

Author information

KEYWORDS: Cesarean delivery; Hong Kong; Twins; Vaginal delivery



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A Randomized Trial of Planned Cesarean or Vaginal Delivery for Twin Pregnancy

Jon F.R. Barrett, M.B., B.Ch., M.D., Mary E. Hannah, M.D.C.M., Eileen K. Hutton, Ph.D., Andrew R. Willan, Ph.D., Alexander C. Allen, M.D.C.M., B. Anthony Armson, M.D., Amiram Gafni, D.Sc., K.S. Joseph, M.D., Ph.D., Dalah Mason, M.P.H., Arne Ohlsson, M.D., Susan Ross, Ph.D., J. Johanna Sanchez, M.I.P.H., and Elizabeth V. Asztalos, M.D., for the Twin Birth Study Collaborative Group*

J Matern Fetal Neonatal Med. 2016;29(7):1094-100. doi: 10.3109/14767058.2015.1035640. Epub 2015 Apr 20.

Twin pregnancy outcomes after increasing rate of vaginal twin delivery: retrospective cohort study in a Hong Kong regional obstetric unit.

Tang HT[1], Liu AL[1], Chan SY[1], Lau CH[1], Yung WK[1], Lau WL[1], Leung WC[1].

Author information

Abstract

OBJECTIVE: To determine any change in adverse neonatal/maternal outcomes after increasing the rate of vaginal twin delivery by comparing vaginal twin delivery and caesarean delivery with our previous cohort study.

METHODS: In a retrospective cohort study, all twins booked at a Hong Kong regional obstetrics unit were evaluated during a 3-year period from 1 April 2009 to 31 March 2012.

RESULTS: Out of the 269 sets of twins who eventually delivered in our unit, 68 (25.3%) of them were delivered vaginally, compared to 15.8% in our previous cohort study ($p = 0.02$). For those who were suitable for vaginal delivery, significantly more women attempted vaginal delivery: 93/133 (69.9%) versus 47/100 (47%) ($p = 0.0005$). The success rate for vaginal delivery and rate of requiring caesarean delivery for the 2nd twin were similar between these two periods. There were significantly more 2nd twins with cord blood pH < 7.2 when both twins were delivered by vaginal delivery. Otherwise, there was no significant difference between other neonatal/maternal morbidities.

CONCLUSION: With proper counseling, significantly more women who were suitable for vaginal twin delivery would opt to do so. There was no significant increase in neonatal/maternal morbidities despite the increased rate of vaginal twin delivery.

KEYWORDS: Caesarean delivery; maternal outcome; neonatal outcome; twins; vaginal delivery

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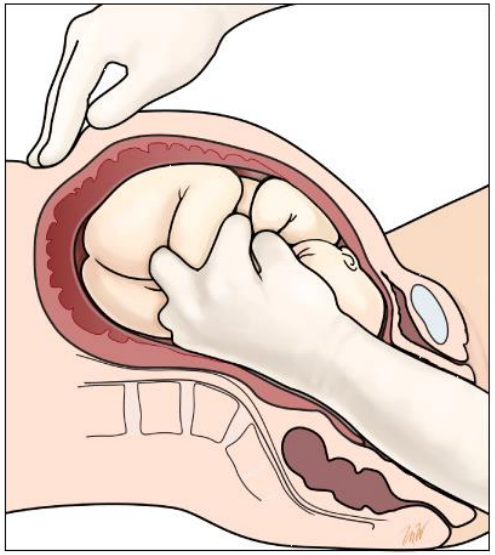

Modified from: Pritchard JA, MacDonald PC. Williams Obstetrics, 16th Edition, Appleton-Century-Crofts, New York 1980.

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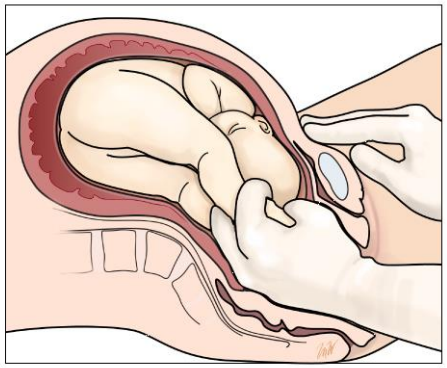

Upward pressure on head is applied as downward traction is exerted on feet.

...m: Pritchard JA, MacDonald PC. Williams Obstetrics, 16th Edition, Appleton-...ofts, New York 1980.

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Source: Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY: *Williams Obstetrics, 23rd Edition:* http://www.accessmedicine.com

Carbetocin – Pharmacodynamics

	Oxytocin		Carbetocin	
	intravenous	intramuscular	intravenous	intramuscular
Onset of action	< 1 minute	< 2.5 minutes	< 1.5 minutes	< 2 minutes
Duration of rhythmic contractions	8 minutes	15 minutes	60 minutes	120 minutes
Contraction time	16 minutes	30 minutes	67 minutes	131 minutes

Data compiled from Sweeney *et al* 1990; Hunter *et al* 1992; Ferring, Data on file.

Table 2. Uterine activity after intramuscular or intravenous injection of oxytocin or Pabal®



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