

Caesarean Section of Multifetal Pregnancy

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Abstract

Planned caesarean delivery (CD) did not significantly decrease or increase the risk of fetal or neonatal death or serious neonatal morbidity in twin pregnancy between 32^{0/7} and 38^{6/7} weeks of gestation, with the first twin in the vertex presentation. As prevalence rises for the second twin, emergency CD is necessary for delivery of the second twin after vaginal delivery of the first twin. Waiting after 38 weeks' gestation essentially requires close fetal and maternal surveillance to identify if those pregnancies may benefit to extend a gestational period. It is important to construct a system in which an emergency CD can be performed anytime. The caesarean section does not change in even multifetal pregnancy. Each step after laparotomy has few tips: (1) because the uterus strongly leans to the right, image the uterine rotation. To avoid thick vessels on the uterine lateral wall, perform long U-shaped incision using a scissor. 2) Ensure not to rupture the membrane of the second twin before delivery of the first twin. (3) Check the presentation of the second twin before rupture of that fetus's membrane. The second twin tends to change the presentation. If the upper uterine segment will clamp down and entrap the second twin, a vertical uterine incision is performed without hesitation. Women with multifetal pregnancy are at increased risk of postpartum hemorrhage (PPH). Mainly PPH is caused by uterine atony. Oxytocin should be prepared before starting the CD. All bleeding may not be recognized in the operation field. Do not lose the timing of blood transfusion.

Keywords

- ▶ multifetal pregnancy
- ▶ twin pregnancy
- ▶ caesarean section
- ▶ postpartum hemorrhage

Selection of Surgical Technique

Indications of Caesarean Delivery for Twin Pregnancy

Twin pregnancy is associated with increased perinatal mortality than singleton pregnancy because of complications during birth. Higher rates of adverse perinatal outcome have been reported for the twin pregnancy at full or near term if born by vaginal (VD) versus caesarean delivery (CS).¹ But there was no clear evidence of differences between planned VD and CS for maternal death or serious morbidity (risk ratio [RR] = 0.86, 95% confidence interval [CI]: 0.67–1.11), and there was no significant difference for perinatal or neonatal death or serious neonatal morbidity between planned VD and CS (RR = 1.15, 95% CI: 0.80–1.67).² However, monochorionic, monoamniotic twins are avoided VD because of anxiety for tangled umbilical

cords. Currently, if the operator is not experienced in vaginal breech delivery, CD is performed even for singleton pregnancy. Additionally, breech–vertex presentation is capable of occurring interlocking. It is generally performed in planned CD in which the first twin is in nonvertex presentation. Although there is no evidence that VD of fetus in vertex presentation weighing less than 1,500 g is associated with any increased risk of perinatal mortality, planned CD is recommended for low-birth weight twin and preterm delivery prior to 34 weeks' gestation. If the first twin is in vertex presentation and fetuses weighing at least 1,500 g or reaching at least 32 weeks' gestation, a low 5-minute Apgar's score occurred less frequently by planned CS.³ In twin pregnancy, between 32^{0/7} and 38^{6/7} weeks of gestation, with the first twin in the vertex presentation, planned CD did not significantly decrease or increase the

Table 1 Indications of cesarean delivery for twin pregnancy

Chorionicity	Monochorionic monoamniotic twin
Gestational age (wk)	<32
Presentation	The first twin in the nonvertex presentation
Estimated fetal weight (g)	<1,500
	Weight discordancy > 25%
Present of cesarean delivery indications for singleton pregnancy	
Shortage of human resources, materials, and informed consents	

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risk of fetal or neonatal death or serious neonatal morbidity, as compared with planned VD.⁴ Indications of CD is given in ►Table 1.

Timing of Planned CD

Minakami et al reported that the incidence of stillbirth and early neonatal death gradually declined until 37 to 38 weeks' gestation and then increased. So, limiting the estimated date of delivery from 37 to 38 weeks may be appropriate in multifetal pregnancies.⁵ Luke reported that in the United States, the lowest fetal death rates in twin pregnancies occurred at 36 to 37 week's gestation, too.⁶ On the other hand, there were significantly many neonates with respiratory disorders in which those have undergone CD labor before 38 weeks' gestation than those after 38 weeks' gestation.⁷ In this article, it is noted that avoiding CD until the onset of labor or until after 38 weeks' gestation should be considered. As gestational weeks progress, the risk of pre-term delivery is sharply increases. The odds ratio for delivery within 1 week in multifetal pregnancies compared with singleton pregnancies was 5.9 (95% CI: 5.4–6.5) at 22 weeks'

gestation and 13.7 (95% CI: 13.1–14.2) at 33 weeks' gestation.⁸ Thus progressing weeks lead to the increasing possibility of emergency CD. In addition, women pregnant with multifetal pregnancy have significantly greater and more severe pregnancy-related complications, such as hypertensive disorder of pregnancy, HELLP syndrome (hemolysis, elevated liver enzymes, low platelet count), cardiomyopathy, thrombosis, and others. Therefore in multifetal pregnancy, waiting after 38 weeks' gestation essentially requires close fetal and maternal surveillance to identify if those pregnancies may benefit to extend a gestational period. It is important to construct the system that an emergency CD can perform anytime.

Surgical Steps

The procedure of CD in twin pregnancy shows in ►Fig. 1. The CD does not change in even multifetal pregnancy. Each step after laparotomy has few tips.

In-Depth Explanation

Myometrium Incision—Imaging of Uterine Rotation and Long U-Shaped Incision

In multifetal pregnancy, the uterus strongly leans to the right to put the uterus which enlarged excessively in a pelvis (dextrorotation). The authors incise myometrium after a pause, and then the round ligament and center of the uterus were confirmed as well. There are lots of blood vessels including the cervix of uterus venous plexus at the lateral wall of uterus that increase the risk of ureter injury (►Fig. 2A).

At lower uterine segment, transverse incision is used safely in most instances. In the cases where uterine internal os opened and uterine effacement progressed, an appropriate myometrial incision line progresses upward. The height of the vesicouterine pouch may not be at appropriate line (►Fig. 2B). If the pelvis is too deep and seems to be hard to operate, transverse incision is performed without detachment of the peritoneum over the vesicouterine pouch.

The multifetal pregnancy has many cases that placenta is located at anterior wall and may result placenta previa. There are lots of thick blood vessels. Ligation of these is considered before the myometrium incision.

To extend a myometrium wound using a scissor is recommended after reach out at the membrane. We insert Pean's forceps between a membrane and a myometrium or pull up myometrium with a finger without rupture of the membrane. In addition, in case of rupture of the membrane, the scissor does not injure the fetuses. The incision line looks like U-shaped, near to V-shaped, and is longer than singleton pregnancy. U-shaped myometrium incision prevents injury to the vascular plexus of the uterine lateral wall. Then move the scissor forward to the beginning of the round ligament (►Fig. 3). Once the myometrium wound suturing is done, surprisingly it will not appear curved. Using a scissor is easy to

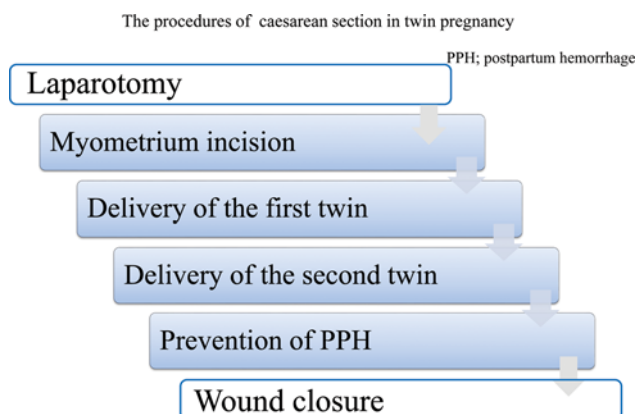


Fig. 1 Surgical steps. The procedures of caesarean section in twin pregnancy. PPH, postpartum hemorrhage.

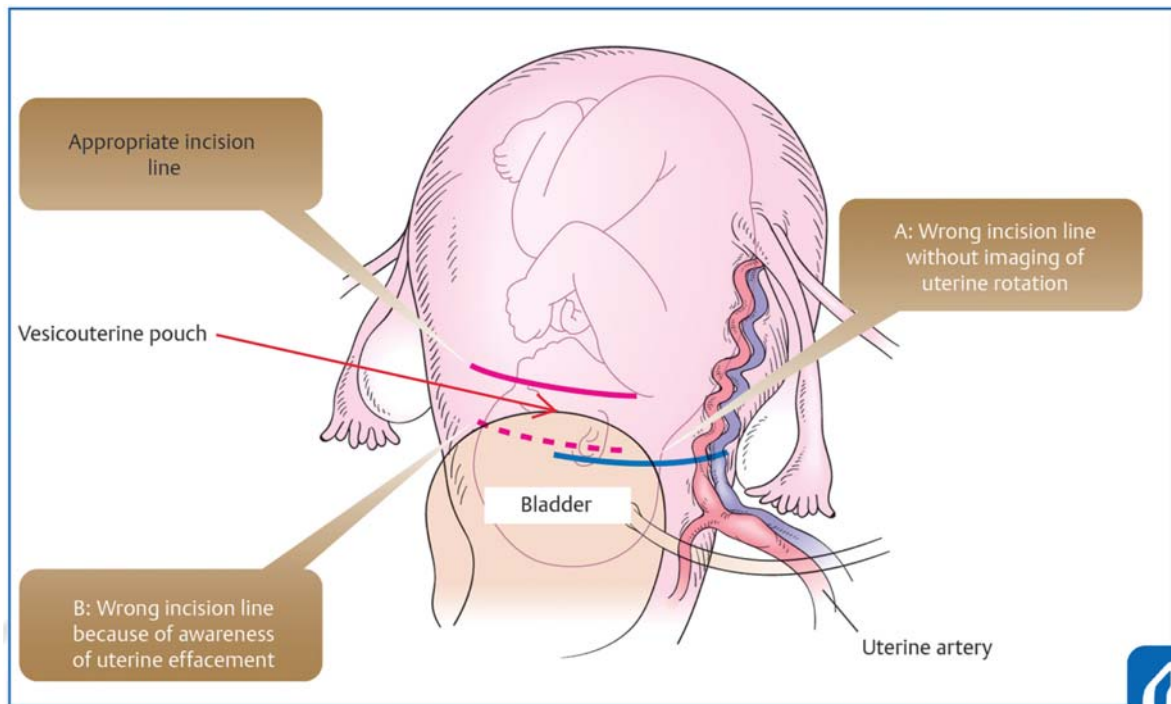


Fig. 2 Myometrium incision with imaging of uterine rotation. (Reproduced with permission from Tanigaki S, Iwashita M. Multifetal pregnancy. In: Hiramatsu Y, Konishi I, Sakuragi N, Takeda S, eds. Mastering the Essential Surgical Procedures OGS NOW, No.3. Cesarean Section (Japanese). Tokyo: Medical View; 2010: 56–63. Copyright © Medical View).

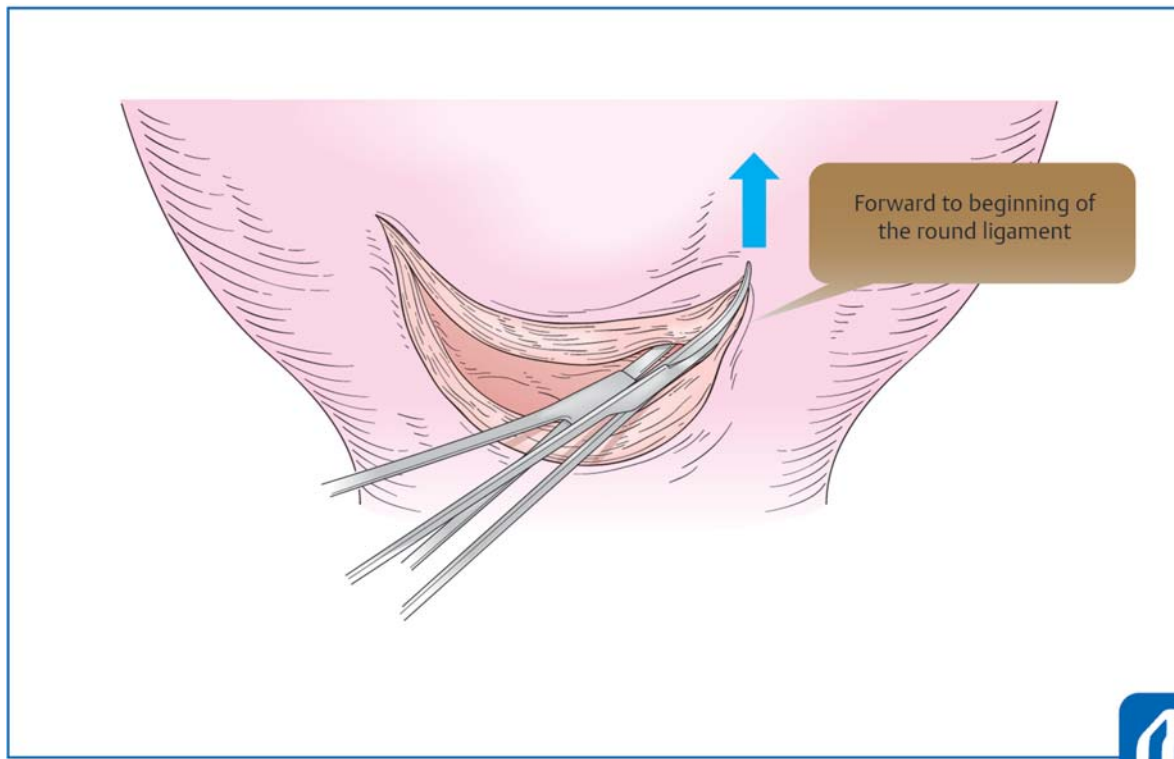


Fig. 3 U-shaped myometrium incision using a scissor and Pean's forceps forward to beginning of the round ligament. (Reproduced with permission from Tanigaki S, Iwashita M. Multifetal pregnancy. In: Hiramatsu Y, Konishi I, Sakuragi N, Takeda S, eds. Mastering the Essential Surgical Procedures OGS NOW, No.3. Cesarean Section (Japanese). Tokyo: Medical View; 2010: 56–63. Copyright © Medical View).

Table 2 Causes of PPH in multifetal pregnancy

Uterine atony	Hyperextension of uterus Fatigue of myometrium: long usage of tocolytic agent including of magnesium sulfate to management preeclampsia Placenta located in the lower uterine segment: huge size of placenta
Delay of myometrium suture	Delayed placenta delivery
High risk of complications	High risk of disorder of blood coagulation: GT, PIATD, HELLP syndrome, acute fatty liver

Abbreviations: GT, gestational thrombocytopenia; HELLP, hemolysis, elevated liver enzymes, low platelet count; PIATD, pregnancy-induced antithrombin deficiency; PPH, postpartum hemorrhage.

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perform J- or L-shaped incision and can also avoid myoma of the uterus and thick vessels. One has to learn to extend the wound with the help of finger properly. But in the case of emergency, using a scissor is not recommended without having usual training.

Delivery of the First Twin—Is the Fetus Really the First Twin?

The second twin makes the delivery of the first twin difficult. A longer myometrium incision is helpful. Do not rupture of the membrane immediately when

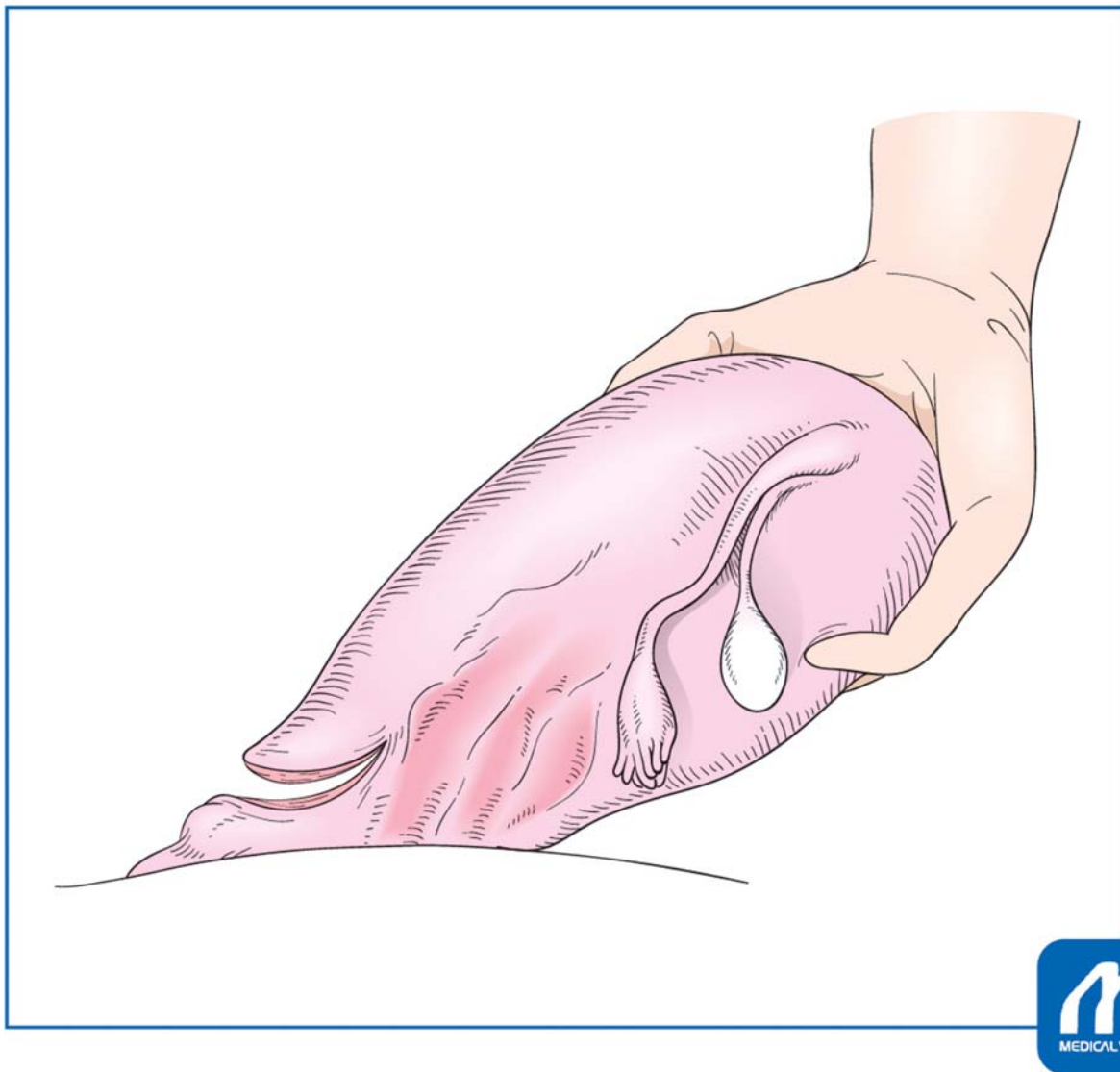


Fig. 4 Uterus is drawn the outside of the abdominal wall. (Reproduced with permission from Tanigaki S, Iwashita M. Multifetal pregnancy. In: Hiramatsu Y, Konishi I, Sakuragi N, Takeda S, eds. Mastering the Essential Surgical Procedures OGS NOW, No.3. Cesarean Section (Japanese). Tokyo: Medical View; 2010: 56–63. Copyright © Medical View).

membrane is visible. In the case of multifetal pregnancy, the membrane which is easy to rupture may be second twin's membrane. If the membrane of the second twin is ruptured before the first twin's delivery, operation afterward is hard. Therefore, we have a pause, too. Check the both twins and, if delivery is possible, rupture of that fetus's membrane.

Delivery of the Second Twin—Check the Presentation and Care of Entrapment

After the first twin's delivery, keep the membrane of the second twin. There is always the risk that the second twin changes the presentation and the upper uterine segment will clamp down and entrap the second twin.

At first check the presentation of the second twin before rupture of that fetus's membrane. If the fetus is nonvertex, make intrauterine manipulation to footing presentation. It is difficult to hold the fetal head, whereas it is easy to hold the foot by palpating fetus's heel.

If contraction ring may develop the upper uterine segment, a vertical uterine incision is performed without hesitation. And uterine relaxation with 50 to 100 µg intravenous nitroglycerine is considered. Because nitroglycerine takes 1 minute until an effect is given, it is prepared before starting the operation and early decision is necessary.

Warnings

Prevention of Postpartum Hemorrhage

Women with multifetal pregnancy are at increased risk of postpartum hemorrhage (PPH). As shown in ►Table 2, causes of PPH in multifetal pregnancy.

Mainly PPH is caused by uterine atony. An oxytocin intravenous infusion or injection is performed immediately after delivery of the second twin. So oxytocin should be prepared before starting the CD. Urgent manual removal of placentas causes remained placenta that can increase the amount of bleeding. After placenta delivery, uterine posterior wall is confirmed that it does not have the adhesion. Then uterus pulls up outside of the abdominal cavity (►Fig. 4). The both uterine arteries are suppressed by the abdominal wall, and the bleeding from the myometrial wound is reduced. In addition, because bleeding does not accumulate in the wound, it is easy to get a field of vision and to myometrium suture. But it is important to train myometrium suture at intra-abdominal space. Because the uterus is huge or there are severe adhesions around the uterus, uterus cannot pull out the outside of the abdominal cavity. If hemostasis is insufficient, insertion of a balloon and gauze is recommended along with suture. Tourniquet technique to suppress uterine cervix and parametrium is a simple and an effective maneuver (►Fig. 5).

All bleeding may not be recognized in the operation field. Blood pressure and heart rate or shock index(SI; the heart rate/systolic blood pressure) may not show a state for the massive bleeding. We would like to cautious surgeons from losing the timing of the blood transfusion.

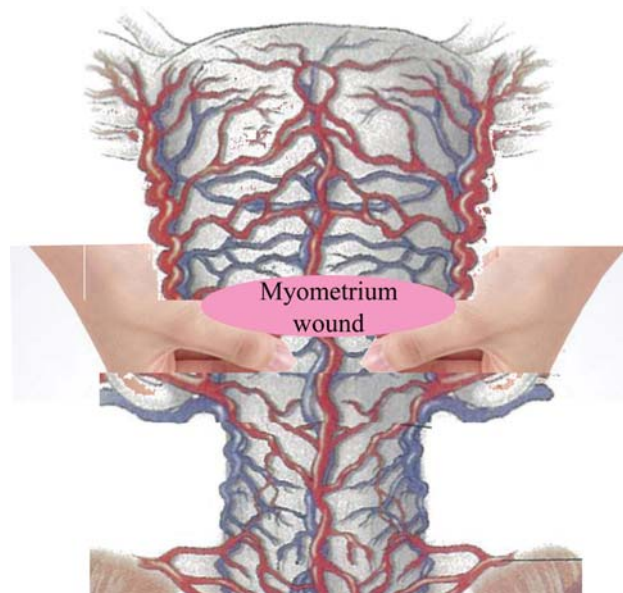


Fig. 5 Tourniquet technique. (Reproduced with permission from Dr. Shinji Tanigaki).

Risk of Emergency Caesarean Section after Vaginal Delivery

In the vaginal birth of the multifetal pregnancy, emergency CD is necessary for delivery of the second twin after VD of the first twin. The second twin does not fix in a pelvis after the prompt delivery of the first twin, then descending umbilical cord, malrotation, and abnormal presentation may occur. In addition, sustained bradycardia and abruption of placentae with sudden uterine contraction can be caused. As per literature, 9.45% of the second twin was performed emergency CD after VD of the first twin.⁹ The risk of the second twin performed by emergency CD after VD of the first twin, that is, vertex-vertex presentation, is approximately 7%. But vertex-nonvertex presentation becomes higher with approximately 23% as for the risk.¹⁰ The prevalence (low 5-minute Apgar's score, respirator management, and convulsions) rises for the second twin, if an emergency CD was performed.⁹

Conflict of Interest

None declared.

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