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## OBSTETRICS

# Mode of Delivery at Siriraj Hospital: A Ten-Year Review (2001-2010)

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**ABSTRACT**

**Objective:** To study mode of delivery and trend of cesarean section, indication of operative delivery and maternal and perinatal mortality at Siriraj Hospital for 10-year period (2001-2010)

**Material and Method:** The medical records of mode of delivery, indication and maternal and perinatal mortality at Siriraj Hospital during 2001-2010 were collected and analyzed.

**Results:** During 10-year period, the birth was decreased from 9,555 cases in the year 2001 to 8,853 cases in the year 2010. The rate of single spontaneous vaginal delivery was decreased steadily from the year 2001 (67.1%) to 2010 (53.8%) while the rate of low transverse cesarean section was increased from the year 2001 (27.9%) to the year 2010 (44.5%). The rates of low forceps operation, vacuum extraction and birth before arrival were all decreased steadily from the year 2001 to the year 2010, (forceps operation: 2.99% to 0.44%, vacuum extraction: 8.79% to 2.74%, birth before arrival: 1.1% to 0.05%). Perinatal mortality rate (/1,000 births) after abdominal delivery was continued decreased from the year 2001 (2.4%) to 2006 (0.7%), then increased from the year 2007 (1.4%) to 2010 (2.9%). Perinatal mortality rate (/1,000 births) after vaginal delivery was not changed from the year 2001 (0.94%) to 2010 (0.56%).

**Conclusion:** The cesarean rate has continued increased while spontaneous vaginal delivery was decreased during the last 10 years. Cesarean section without definite indication must be concerned because the complication and uneventful evidence might be reduced.

**Keywords:** mode of delivery, cesarean section, indication, maternal and perinatal mortality

## Introduction

According to many advanced medical and surgical technology during intrapartum care, early detection of maternal and fetal complications during labour has increased and resulted in the rising rate of operative delivery, especially cesarean section. Cesarean section without definite indication, including cesarean section on maternal request, are also the major problem.[1] The increasing cesarean section may result in the complications and costs of operative procedures. Even though cesarean section is the safe method, the operation should be considered with only the indications. Many countries have reported the increasing cesarean rates in the last few decades,[2-4]

while the World Health Organization has suggested that cesarean section should not exceed 15%.[5] Many reasons of rising in cesarean rates included maternal request[6] and no definite indicated risk.[7] The prevalence of cesarean section on maternal request is about 1%-8% and 1%-3% of all cesarean deliveries worldwide and in the United States, respectively.[8] However, this indication does not approved in Siriraj Hospital, therefore elective cesarean section has been used instead. Cesarean section without definite indication has become obvious. The complications of cesarean section are maternal risks of surgical procedure, neonatal respiratory morbidity and abnormal placentation including placenta previa and accreta in subsequent pregnancy.

The object of this study was to determine the trends in operative delivery and indications of procedures in Siriraj Hospital (SH) during the past 10 years. The preliminary of this study should be help to explore the problems for management guideline in the future.

## Material and Method

The study was approved by the Ethics Committee at Faculty of Medicine Siriraj Hospital, Mahidol University, approval number SI 008/2011. Medical records of methods of delivery in Siriraj Hospital during 2001-2010 were reviewed. Total singleton delivery, mode of delivery, indications of operative procedures and perinatal and maternal death were collected and analyzed.

### *Statistic analysis*

SPSS version 13 was used to analyze the data. The data were presented in number and percentage.

**Table 1.** Mode of singleton delivery during year 2001-2010

| Year | Operative delivery [cases (%)] | | | | Total operative delivery cases (%) | Single spontaneous vaginal delivery [cases (%)] | Birth before arrival [cases (%)] | Total singleton delivery [cases (%)] |
|---|---|---|---|---|---|---|---|---|
| | Low transverse cesarean delivery | Low forceps | Vacuum extraction | Other operative delivery | | | | |
| 2001 | 2663 (27.87) | 91 (0.96) | 267 (2.79) | 17 (0.18) | 3,038 (31.80) | 6,412 (67.10) | 105 (1.10) | 9,555 (100) |
| 2002 | 2,727 (29.78) | 46 (0.50) | 223 (2.44) | 11 (0.12) | 3,007 (32.84) | 6,030 (65.84) | 121 (1.32) | 9,158 (100) |
| 2003 | 2,952 (32.71) | 71 (0.79) | 212 (2.35) | 11 (0.12) | 3,246 (35.97) | 5,660 (62.72) | 118 (1.31) | 9,024 (100) |
| 2004 | 3,041 (33.74) | 58 (0.64) | 216 (2.40) | 14 (0.16) | 3,329 (36.94) | 5,633 (62.51) | 50 (0.55) | 9,012 (100) |
| 2005 | 3,159 (36.58) | 30 (0.35) | 269 (3.12) | 17 (0.20) | 3,475 (40.25) | 5,157 (59.72) | 3 (0.03) | 8,635 (100) |
| 2006 | 2,629 (37.61) | 11 (0.16) | 230 (3.29) | 13 (0.19) | 2,883 (41.25) | 4,104 (58.72) | 2 (0.03) | 6,989 (100) |
| 2007 | 3,331 (36.89) | 25 (0.28) | 180 (1.99) | 10 (0.11) | 3,546 (39.27) | 5,473 (60.62) | 10 (0.11) | 9,029 (100) |
| 2008 | 3,445 (39.19) | 19 (0.22) | 184 (2.09) | 15 (0.17) | 3,663 (41.67) | 5,118 (58.22) | 10 (0.11) | 8,791 (100) |
| 2009 | 3,646 (41.48) | 28 (0.32) | 103 (1.17) | 11 (0.12) | 3,788 (43.09) | 4,992 (56.80) | 10 (0.11) | 8,790 (100) |
| 2010 | 3,936 (44.46) | 18 (0.20) | 112 (1.27) | 18 (0.20) | 4,084 (46.13) | 4,765 (53.82) | 4 (0.05) | 8,853 (100) |

## Results

During the past 10-year period, 2001-2010, the total single delivery is SH was decreased from 9,555 cases in the year 2001 to 8,853 cases in the year 2010, but was increased suddenly in the year 2007 (9,029 cases) then decreased in 2008-2010 (Table 1, Fig. 1). The rate of single spontaneous vaginal delivery was decreased steadily from the year 2001 (67.1%) to 2010 (53.8%) (Table 1) while the rate of low transverse cesarean section was increasing from the year 2001 (27.9%) to the year 2010 (44.5%). (Table 1) Among spontaneous vaginal delivery, vaginal birth after cesarean section and breech delivery were extremely low about 1 to less than 1% during the 10-year period. (Table 2) Forceps and vacuum extractions and spontaneous vaginal delivery were continued decreased while cesarean section was increased from the year 2001 to 2010. (Table 3, Fig. 2) Indication for low forceps delivery, vacuum extraction and low transverse cesarean section are presented respectively. (Table 4-6) Perinatal mortality and maternal death are presented. (Table 7 and 8) Trend of perinatal mortality after low transverse cesarean section is presented. (Fig. 3)

**Table 2.** Detail of single spontaneous vaginal delivery

| Year | Vertex delivery [cases (%)] | Vaginal delivery after cesarean section (VBAC) [cases (%)] | Breech delivery | | Total single spontaneous vaginal delivery [cases (%)] |
|---|---|---|---|---|---|
| | | | Spontaneous [cases (%)] | Assisting [cases (%)] | |
| 2001 | 6,331 (98.73) | 10 (0.16) | 68 (1.06) | 3 (0.05) | 6,412 (100) |
| 2002 | 5,954 (98.74) | 8 (0.13) | 66 (1.10) | 2 (0.03) | 6,030 (100) |
| 2003 | 5,590 (98.76) | 10 (0.18) | 58 (1.02) | 2 (0.04) | 5,660 (100) |
| 2004 | 5,574 (98.95) | 9 (0.16) | 48 (0.85) | 2 (0.04) | 5,633 (100) |
| 2005 | 5,104 (98.97) | 11 (0.21) | 39 (0.76) | 3 (0.06) | 5,157 (100) |
| 2006 | 4,073 (99.25) | 8 (0.19) | 19 (0.46) | 4 (0.10) | 4,104 (100) |
| 2007 | 5,428 (99.19) | 9 (0.16) | 33 (0.60) | 3 (0.05) | 5,473 (100) |
| 2008 | 5,088 (99.41) | 6 (0.12) | 23 (0.45) | 1 (0.02) | 5,118 (100) |
| 2009 | 4,969 (99.54) | 7 (0.14) | 13 (0.26) | 3 (0.06) | 4,992 (100) |
| 2010 | 4,737 (99.41) | 7 (0.15) | 18 (0.38) | 3 (0.06) | 4,765 (100) |

**Table 3.** Detail of operative delivery during 2001-2010

| Year | Forceps operation [cases ( %)] | | Vacuum extraction [cases ( %)] | Cesarean section [cases ( %)] | | | Total operative delivery [cases ( %)] |
|---|---|---|---|---|---|---|---|
| | Low forceps | Breech delivery with forceps for the after coming head | | Classical | Low transverse | Cesarean hysterectomy | |
| 2001 | 91 (2.99) | 5 (0.16) | 267 (8.79) | 2 (0.07) | 2,663 (87.66) | 10 (0.33) | 3,038 (100) |
| 2002 | 46 (1.53) | 1 (0.03) | 223 (7.42) | 4 (0.13) | 2,727 (90.69) | 6 (0.20) | 3,007 (100) |
| 2003 | 71 (2.19) | 1 (0.03) | 212 (6.53) | 4 (0.12) | 2,952 (90.95) | 6 (0.18) | 3,246 (100) |
| 2004 | 58 (1.75) | 2 (0.06) | 216 (6.48) | 4 (0.12) | 3,041 (91.35) | 8 (0.24) | 3,329 (100) |
| 2005 | 30 (0.86) | 1 (0.03) | 269 (7.74) | 3 (0.09) | 3,159 (90.91) | 13 (0.37) | 3,475 (100) |
| 2006 | 11 (0.38) | 1 (0.03) | 230 (7.98) | 7 (0.24) | 2,629 (91.20) | 5 (0.17) | 2,883 (100) |
| 2007 | 25 (0.71) | 0 (0) | 180 (5.08) | 0 (0) | 3,331 (93.93) | 10 (0.28) | 3,546 (100) |
| 2008 | 19 (0.52) | 0 (0) | 184 (5.02) | 0 (0) | 3,445 (94.05) | 15 (0.41) | 3,663 (100) |
| 2009 | 28 (0.74) | 0 (0) | 103 (2.72) | 0 (0) | 3,646 (96.25) | 11 (0.29) | 3,788 (100) |
| 2010 | 18 (0.44) | 0 (0) | 112 (2.74) | 0 (0) | 3,936 (96.38) | 18 (0.44) | 4,084 (100) |

**Table 4.** Indications for low forceps delivery

| Indications | | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | [cases (%)/Total singleton delivery] | | | | | | | | | |
| Maternal | Heart disease | 5 (0.05) | 4 (0.04) | 1 (0.01) | 1 (0.01) | 3 (0.03) | 0 (0) | 2 (0.02) | 0 (0) | 1 (0.01) | 1 (0.01) |
| | Hypertensive disorder in pregnancy | 12 (0.12) | 6 (0.06) | 2 (0.02) | 6 (0.06) | 1 (0.01) | 1 (0.01) | 2 (0.02) | 1 (0.01) | 1 (0.01) | 3 (0.03) |
| | Other indication | 0 (0) | 0 (0) | 0 (0) | 1* (0.01) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 2** (0.02) |
| Fetal | Stress (distress) | 35 (0.37) | 22 (0.24) | 40 (0.44) | 25 (0.28) | 17 (0.19) | 7 (0.10) | 13 (0.14) | 10 (0.11) | 17 (0.19) | 5 (0.06) |
| | Breech delivery with forceps for the after coming head | 5 (0.05) | 1 (0.01) | 1 (0.01) | 2 (0.02) | 1 (0.01) | 1 (0.01) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Prolonged second stage of labour | | 19 (0.20) | 7 (0.08) | 9 (0.10) | 10 (0.11) | 2 (0.02) | 1 (0.01) | 4 (0.04) | 4 (0.04) | 7 (0.08) | 3 (0.03) |
| Prophylactic | | 15 (0.16) | 6 (0.06) | 18 (0.20) | 13 (0.14) | 6 (0.07) | 1 (0.01) | 4 (0.04) | 4 (0.04) | 2 (0.02) | 4 (0.04) |
| Total of low forceps delivery / total delivery (% of total low forceps delivery / %total delivery) | | 91/9,555 (0.96/100) | 46/9,158 (0.50/100) | 71/9,024 (0.79/100) | 58/9,012 (0.64/100) | 30/8,635 (0.35/100) | 11/6,989 (0.16/100) | 25/9,029 (0.28/100) | 19/8,791 (0.22/100) | 28/8,790 (0.32/100) | 18/8,853 (0.20/100) |

* Brain stem tumor of mother

** Epilepsy of mother

**Table 5.** Indications for vacuum extraction

| Indications | | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | [cases (%)/Total singleton delivery] | | | | | | | | | |
| Maternal | Heart disease | 0 (0) | 9 (0.10) | 7 (0.08) | 1 (0.01) | 5 (0.06) | 4 (0.06) | 4 (0.04) | 2 (0.02) | 1 (0.01) | 2 (0.02) |
| | Hypertensive disorder in pregnancy | 28 (0.29) | 16 (0.17) | 6 (0.06) | 15 (0.17) | 15 (0.17) | 9 (0.13) | 2 (0.02) | 5 (0.06) | 2 (0.02) | 4 (0.04) |
| | Other indication | 0 (0) | 1* (0.01) | 0 (0) | 0 (0) | 0 (0) | 1** (0.01) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Fetal Stress (distress) | | 99 (1.04) | 99 (1.08) | 90 (0.99) | 73 (0.81) | 100 (1.16) | 83 (1.19) | 45 (0.50) | 64 (0.73) | 39 (0.44) | 41 (0.46) |
| Prolonged second stage of labour | | 93 (0.97) | 69 (0.75) | 68 (0.75) | 70 (0.78) | 50 (0.58) | 58 (0.83) | 69 (0.76) | 67 (0.76) | 36 (0.41) | 22 (0.25) |
| Maternal exhaustion | | 37 (0.39) | 27 (0.29) | 33 (0.36) | 55 (0.61) | 96 (1.11) | 74 (1.06) | 56 (0.62) | 44 (0.50) | 23 (0.26) | 36 (0.41) |
| Prophylactic | | 10 (0.10) | 2 (0.02) | 8 (0.09) | 2 (0.02) | 3 (0.03) | 1 (0.01) | 4 (0.04) | 2 (0.02) | 2 (0.02) | 7 (0.08) |
| Total of vacuum extraction / total delivery (% of total vacuum extraction / %total delivery) | | 267/9,555 (2.79/100) | 223/9,158 (2.44/100) | 212/9,024 2.35/(100) | 216/9,012 (2.40/100) | 269/8,635 (3.12/100) | 230/6,989 (3.29/100) | 180/9,029 (1.99/100) | 184/8,791 (2.09/100) | 103/8,790 (1.17/100) | 112/8,853 (1.27/100) |

*asthma ** cerebral venous thrombosis in pregnancy

**Table 6.** Indications for low transverse cesarean section

| | Indications | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | [cases (%)/Total singleton delivery] | | | | | | | | | |
| Maternal | Hypertensive disorder in pregnancy | 37 (0.39) | 43 (0.47) | 40 (0.44) | 71 (0.79) | 86 (0.99 ) | 80 (1.14) | 129 (1.42) | 102 (1.16) | 87 (0.99) | 149 (1.68) |
| | Heart disease | 0 (0) | 0 (0) | 1 (0.01) | 0 (0) | 3 (0.03) | 1 (0.04) | 4 (0.04) | 1 (0.01) | 1 (0.01) | 3 (0.03) |
| | Diabetes mellitus | 16 (0.16) | 3 (0.03) | 3 (0.03) | 7 (0.07) | 24 (0.27) | 12 (0.12) | 148 (1.64) | 24 (0.27) | 18 (0.20) | 38 (0.43) |
| | Sexual transmitted disease | 17 (0.17) | 13 (0.14) | 35 (0.38) | 37 (0.41) | 35 (0.41) | 17 (0.17) | 12 (0.13) | 8 (0.09) | 16 (0.18) | 26 (0.29) |
| | Venous complication | 1 (0.01) | 1 (0.01) | 2 (0.02) | 3 (0.03) | 0 (0) | 0 (0) | 0 (0) | 3 (0.03) | 2 (0.02) | 1 (0.01) |
| Fetal | Stress (distress) | 259 (2.71) | 286 (3.12) | 422 (4.67) | 330 (3.66) | 314 (3.63) | 215 (2.15) | 214 (2.37) | 318 (3.62) | 326 (3.71) | 388 (4.38) |
| | malpresentation | 162 (1.69) | 216 (2.36) | 194 (2.15) | 192 (2.13) | 257 (2.97) | 105 (1.05) | 116 (1.28) | 196 (2.23) | 144 (1.64) | 113 (1.27) |
| | Abnormalities | 12 (0.12) | 7 (0.07) | 15 (0.16) | 25 (0.27) | 43 (0.49) | 31 (0.31) | 241 (2.67) | 36 (0.41) | 14 (0.16) | 15 (0.17) |
| Previous cesarean section | | 846 (8.85) | 849 (9.27) | 825 (9.14) | 777 (8.62) | 831 (9.62) | 739 (7.39) | 986 (10.92) | 1,059 (12.04) | 1,029 (11.71) | 1,086 (12.27) |
| Abnormalities of pelvic organs | | 31 (0.32) | 1 (0.01) | 47 (0.52) | 1 (0.01) | 6 (0.07) | 5 (0.05) | 1 (0.01) | 19 (0.22) | 1 (0.01) | 2 (0.02) |
| Cephalopelvic disproportion | | 840 (8.79) | 1,004 (10.96) | 921 (10.21) | 990 (10.98) | 929 (10.76) | 1,125 (11.26) | 1,079 (11.95) | 1,210 (13.76) | 1,355 (15.41) | 1,119 (12.64) |
| Placental complication | | 103 (1.07) | 91 (0.99) | 66 (0.73) | 89 (0.99) | 85 (0.98) | 58 (0.58) | 73 (0.81) | 74 (0.84) | 77 (0.87) | 76 (0.86) |
| Amniotic fluid complication | | 57 (0.59) | 62 (0.67) | 56 (0.62) | 58 (0.64) | 73 (0.84) | 35 (0.35) | 64 (0.71) | 131 (1.49) | 142 (1.61) | 182 (2.05) |
| Umbilical cord complication | | 6 (0.06) | 4 (0.04) | 10 (0.11) | 10 (0.11) | 9 (0.10) | 9 (0.09) | 5 (0.05) | 10 (0.11) | 5 (0.05) | 5 (0.06) |
| No definite indication | | 276 (2.89) | 147 (1.61) | 315 (3.49) | 451 (5.00) | 464 (5.37) | 197 (1.97) | 259 (2.86) | 128 (1.45) | 429 (4.88) | 733 (8.28) |
| Total of low transverse cesarean section / total delivery (% of total low transverse cesarean section / %total delivery) | | 2,663/ 9,555 (27.87/ 100) | 2,727/ 9,158 (29.78/ 100) | 2,952/ 9,024 (32.71/ 100) | 3,041/ 9,012 (33.74/ 100) | 3,159/ 8,635 (36.58/ 100) | 2,629/ 9,989 (37.61/ 100) | 3,331/ 9,029 (36.89/ 100) | 3,319/ 8,791 (39.19/ 100) | 3,646/ 8,790 (41.48/ 100) | 3,936/ 8,853 (44.46/ 100) |

**Table 7.** Perinatal and maternal death and perinatal mortality rate following the vaginal delivery

| Year | Low forceps delivery | | | Vacuum extraction | | | Vaginal breech delivery | | | Perinatal mortality rate (/1,000 births) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Perinatal death | | *Maternal death | Perinatal death | | *Maternal death | Perinatal death | | *Maternal death | |
| | Still-birth | Neonatal death | | Still-birth | Neonatal death | | Still-birth | Neonatal death | | |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 3 | 0 | 0.94 (9/9,555) |
| 2002 | 0 | 0 | 0 | 2 | 1 | 0 | 7 | 5 | 0 | 1.64 (15/9,158) |
| 2003 | 0 | 0 | 0 | 1 | 0 | 0 | 8 | 2 | 0 | 1.22 (11/9,024) |
| 2004 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0.99 (9/9,012) |
| 2005 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 1.74 (15/8,635) |
| 2006 | 0 | 0 | 0 | 1 | 0 | 0 | 8 | 3 | 0 | 1.72 (12/6,989) |
| 2007 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0.55 (5/9,029) |
| 2008 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0.57 (5/8,791) |
| 2009 | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 0.91 (8/8,790) |
| 2010 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0.56 (5/8,853) |

*Maternal death rate (/100,000 live births) following vaginal delivery of the year 2001-2010 was zero.

**Table 8.** Perinatal death, maternal death and perinatal mortality rate following abdominal delivery.

| Year | Classical cesarean section | | Maternal death | Low transverse cesarean section | | *Maternal death | Cesarean hysterectomy | | *Maternal death | Perinatal mortality rate (/1,000 births) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Perinatal death | | | Perinatal death | | | Perinatal death | | | |
| | Still-birth | Neonatal death | | Still-birth | Neonatal death | | Still-birth | Neonatal death | | |
| 2001 | 0 | 0 | 0 | 9 | 14 | 0 | 0 | 0 | 0 | 2.4 (23/9,5555) |
| 2002 | 7 | 5 | 0 | 7 | 11 | 0 | 0 | 0 | 0 | (3.3) (30/9,158) |
| 2003 | 1 | 0 | 0 | 2 | 8 | 0 | 0 | 0 | 0 | (1.2) (11/9,024) |
| 2004 | 0 | 0 | 0 | 6 | 7 | 3 | 0 | 0 | 0 | 1.8 (16/9,012) |
| 2005 | 0 | 0 | 0 | 2 | 3 | 1 | 1 | 0 | 0 | 0.8 (7/8,635) |
| 2006 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 0.7 (5/6,989) |
| 2007 | 0 | 0 | 0 | 12 | 1 | 0 | 0 | 0 | 0 | 1.4 (13/9,029) |
| 2008 | 0 | 0 | 0 | 5 | 12 | 0 | 1 | 0 | 0 | 2.0 (18/8,791) |
| 2009 | 0 | 0 | 0 | 5 | 18 | 1 | 0 | 0 | 0 | 2.7 (24/8,790) |
| 2010 | 0 | 0 | 0 | 16 | 9 | 1 | 0 | 0 | 0 | 2.9 (26/8,853) |

*Maternal death following abdominal delivery of the year 2001-2010 are 7 cases.

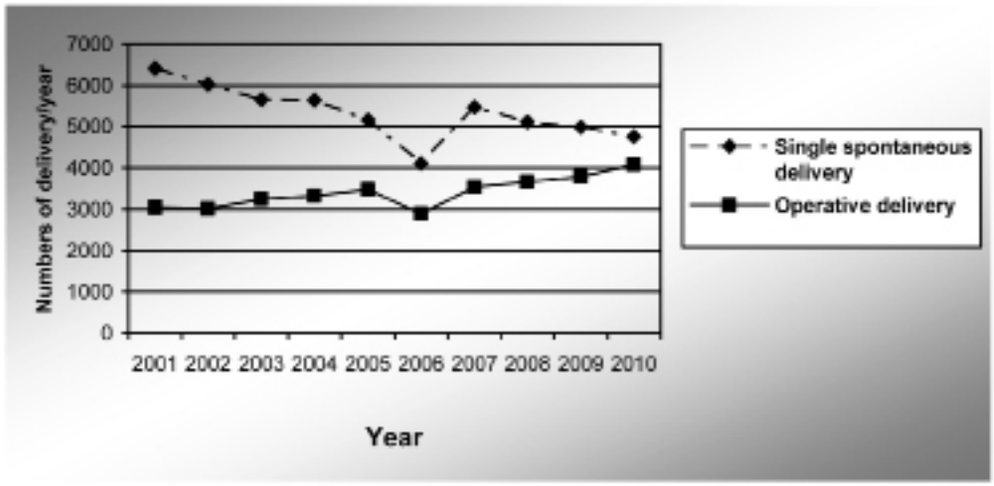


**Fig. 1.** Trend of spontaneous and operative delivery in the year 2001-2010

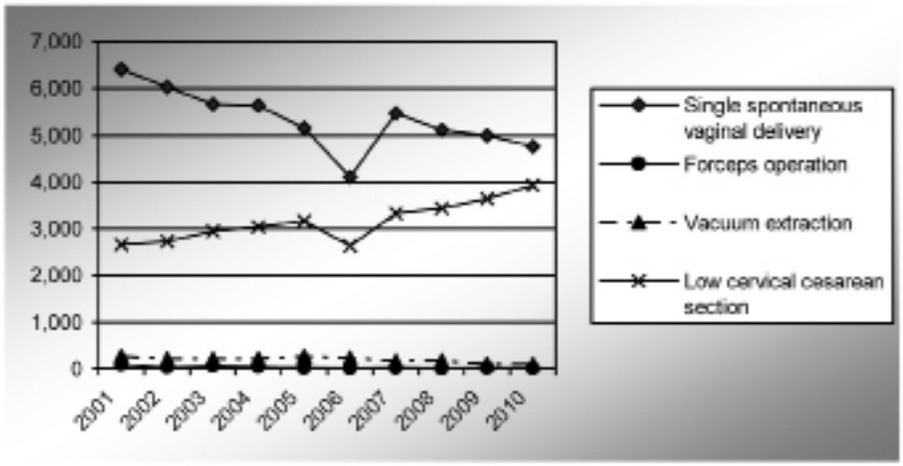


**Fig. 2.** Trend of mode of singleton delivery in the year 2001-2010

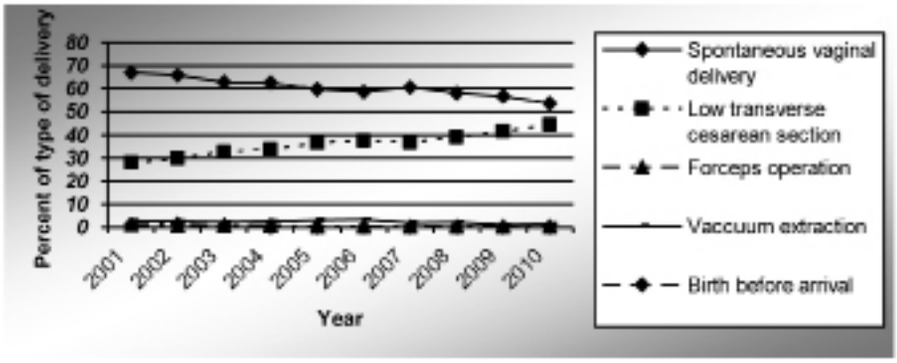


**Fig. 3.** Percentages of each mode of singleton delivery in the year 2001-2010

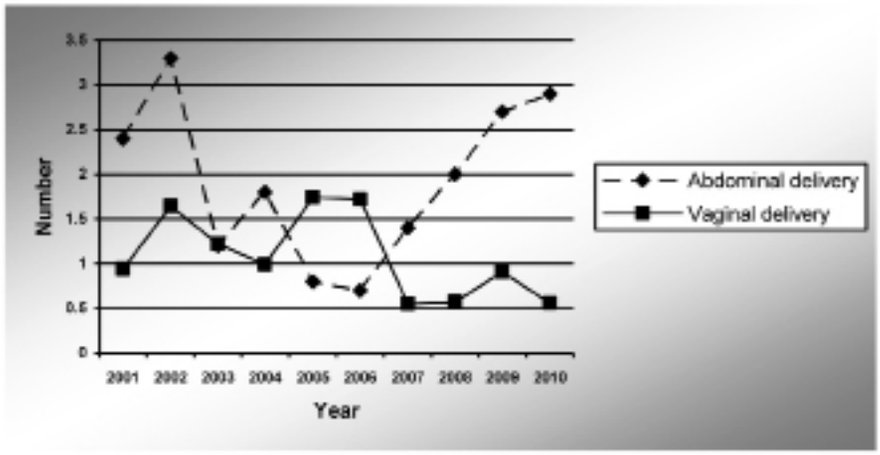


**Fig. 4.** Trend of perinatal mortality rates (/1,000 births) after abdominal and vaginal delivery

## Discussion

From 2001 to 2010 the cesarean rates in SH was increased from 27.9% to 44.5%. Compared with the cesarean rate around the world, this cesarean rate is higher than in those in Norway[9], Australia[10], and other countries in Asia[11]. Moreover, cesarean rates in SH in the year 2009 and 2010 were higher than the year 1979-2008 which was presented in the previous study[12]. On contrary, spontaneous vaginal vertex delivery has continued decreased.

The rate of cesarean section was dramatically increasing in SH. Some reasons which relate to the increasing cesarean rate were cephalopelvic disproportion, previous cesarean section, fetal distress hypertensive disorder in pregnancy, amniotic fluid complication and no definite indication (Table 6). Most of no definite indication could be from the patients with delay in childbirth and reduced parity, decrease in the rate of vaginal breech delivery, abnormal fetal heart rate testing, and fear of malpractice litigation.

Operative vaginal deliveries including forceps and vacuum extractions have been continued decreasing. Most of the patients still believed that fetal head might be injured from these procedures and the intelligence would be affected. Moreover, high expectation of the healthy baby and less skill in the procedures of the obstetricians results in the decreasing rates of these procedures.

Even though the study did not present the indication of cesarean section in the pregnant women whom conceived by assisted reproductive techniques, the authors believed that these patients always underwent cesarean section due to the high expectation of fetal safety without definite indication. The worrisome of pelvic floor or perineal injury are also the reasons to have a cesarean section performed. However, there was only one study that was not proved that problem [13].

The other reason which related to increasing cesarean rate was implication of electronic fetal heart rate monitoring. Electronic fetal heart rate monitoring played an important role to detect abnormal fetal heart rate pattern. Many centers in Thailand especially in SH, use continuous fetal heart rate monitoring to detect fetal hypoxia in order to decrease fetal mortality and morbidity. However, after using continuous fetal heart rate monitoring, the cesarean rate and operative vaginal deliveries were also raised about 66% and 16%, respectively[14]. When compared with intermittent auscultation, continuous fetal heart rate monitoring reduced the risk of neonatal seizure by 50%[14].

According to the increasing medical disputes and lawsuit, obstetricians need to avoid poor skilled vaginal operation and select cesarean section instead in the difficult cases. Moreover, the limitation of pregnant patients in SH and the rising of medical students also

resulted in the inexperienced skilled of vaginal birth.

Even though these opinions might be some over discussion, the authors still believed that advanced maternal age and infertility case, especially the primigravida after 35 years have been increased. Therefore the patients expect to have safety delivery because they will have less opportunity to get pregnant subsequently.

Even though the increasing cesarean rate, trend of perinatal mortality rate is still high. This study has the same result as the previous study which represented the rising trend of perinatal mortality rate with higher cesarean section rate[11].

SH is the medical school where training is one of the major objectives of the center. According to the limitation of study cases in pregnant women and increasing in cesarean rate, medical students are also restricting in skill of spontaneous vaginal delivery. Medical students always learn from the manikin and lack of clinical practice. If cesarean rate can be controlled, skill of vaginal delivery of medical students can be improved.

Treatment of pregnant women with HIV infections has been changed in the past few years. Women with a viral count above 1,000 copies/ml should be offered cesarean delivery at 38 weeks (or earlier if they go into labor). In women who are being treated with highly active antiretroviral therapy (HAART), cesarean delivery (before labor or without prolonged rupture of membranes) appears to further lower the risk for neonatal transmission, particularly among those with viral counts above 1,000 copies/ml. Among patients with low or undetectable viral counts, the evidence supporting a benefit is not as clear; nevertheless, the patient should be given the option of a cesarean delivery[15].

Complications after cesarean section must be discussed with the patients. Those included placenta accrete, placenta increta, placenta percreta, bowel injury, cystotomy, ileus and ureteral injury. Therefore, cesarean delivery without definite indication must be discussed with the patient if they need further subsequent pregnancy[16].

## Conclusion

According to the rising of cesarean rate without medical indication in Siriraj Hospital, obstetricians must be concerned for the complications and related evidences in order to decrease the unnecessary cesarean section.


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## *วิธีการคลอดในโรงพยาบาลศิริราช : การศึกษาย้อนหลัง 10 ปี (พ.ศ. 2544-2553)*

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***ผลการวิจัย*** *: ในช่วงระยะเวลา 10 ปี พบว่าการคลอดลดลงจาก 9,555 ราย ในปี พ.ศ. 2544 เหลือ 8,853 ราย ในปี พ.ศ. 2553 อัตราการคลอดทารกครรภ์เดี่ยวทางช่องคลอดลดลงอย่างต่อเนื่องจากปี พ.ศ. 2544 (ร้อยละ 67.1) เป็นเพียงร้อยละ 53.8 ในปี พ.ศ. 2553 ในขณะที่อัตราการผ่าตัดคลอดเพิ่มขึ้นจากร้อยละ 27.9 ในปี พ.ศ. 2544 เป็นร้อยละ 44.5 ในปี พ.ศ. 2553 อัตราการคลอดโดยการใช้คีมเครื่องดูดสูญญากาศ และการคลอดก่อนมาถึงโรงพยาบาล มีอัตราลดลงเรื่อยๆ ตั้งแต่ปี พ.ศ. 2544 ถึง 2553 ซึ่งการคลอดโดยการใช้คีมลดลงจากร้อยละ 2.99 เป็น 0.44 การคลอดโดยเครื่องดูดสูญญากาศลดลงจากร้อยละ 8.79 เป็น 2.74 และการคลอดก่อนมาถึงโรงพยาบาลจากร้อยละ 1.1 เป็น 0.05 อัตราการตายของทารกปริกำเนิด (ต่อ 1,000 รายของการเกิด) จากการคลอดทางหน้าท้องลดลงจากร้อยละ 2.4 ในปี พ.ศ. 2544 เป็นร้อยละ 0.7 ในปี พ.ศ. 2549 และเพิ่มขึ้นจากร้อยละ 1.4 ในปี พ.ศ. 2550 เป็นร้อยละ 2.9 ใน ปี พ.ศ. 2553 อัตราการตายของทารกปริกำเนิด (ต่อ 1,000 รายของการเกิด) จากการคลอดทางช่องคลอดไม่เปลี่ยนแปลงจากร้อยละ 0.94 ในปี พ.ศ. 2544 เป็นร้อยละ 0.56 ในปี พ.ศ. 2553*

***สรุป*** *: อัตราการผ่าตัดคลอดมีการเพิ่มขึ้นอย่างต่อเนื่องในขณะที่อัตราการคลอดทางช่องคลอดลดลงในช่วงระยะเวลา 10 ปี ที่ผ่านมา ควรพิจารณาถึงการผ่าตัดคลอดโดยไม่มีข้อบ่งชี้ เพราะอาจจะช่วยลดภาวะแทรกซ้อนและเหตุการณ์ไม่พึงประสงค์จากการผ่าตัดลงได้*