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Chorioamnionitis in King Chulalongkorn Memorial Hospital: a five-year review

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ABSTRACT

Objective By means of hospital-based data covering five years, we sought to evaluate the incidence, cause, maternal and neonatal outcomes of chorioamnionitis.

Study design Retrospective descriptive study.

Setting Division of Maternal Fetal Medicine, Department of Obstetrics and Gynecology, Faculty of Medicine , Chulalongkorn University.

Materials and Methods From the obstetric chart records of all deliveries at King Chulalongkorn Memorial Hospital ,Bangkok, between January 1, 1994 and December 31, 1998, we identified all deliveries diagnosed as chorioamnionitis, calculated the incidence rates and identified the cause of chorioamnionitis, as well as maternal and neonatal consequences.

Results There were 151 cases of chorioamnionitis occurring during the study period, giving an incidence of 2.4/1000 deliveries. Most of the cases (49%) occurred in premature rupture of membranes. Cesarean section rate in these cases amounted to 86/151 (57%) and maternal morbidity to 10/151 (6.6%), whereas neonatal morbidity and mortality were 63/151(41.7%) and 4/151(2.6%), respectively.

Conclusion Most of the cases diagnosed as chorioamnionitis at King Chulalongkorn Memorial Hospital occurred in premature rupture of membranes. Maternal morbidity was low whereas neonatal morbidity was high. Improved strategies for management of premature rupture of membranes may reduce the incidence of chorioamnionitis and neonatal morbidity.

Key words: chorioamnionitis, premature rupture of membranes

Chorioamnionitis is defined as clinical infection of the amniotic fluid, membranes, placenta, and/or uterus that occurs immediately before or during delivery.[1,2] The incidence amounts to 0.5-10.5% of all deliveries.[2-8] The pregnancy outcomes after chorioamnionitis vary. It accounts for 10-40% of postpartum febrile morbidity[1] and is associated with 20-40% of early neonatal sepsis and pneumonia.[1] Other terms used include intraamniotic infection, amnionitis, amniotic fluid infection and intrapartum

fever. The purpose of this study was to evaluate the incidence, cause, maternal and neonatal outcomes of chorioamnionitis in our department.

Materials and methods

All cases were recruited from obstetric chart records at the Department of Obstetrics and Gynecology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand from January 1, 1994 to December 31, 1998. Identification of cases was performed by computer selection from the data files. The diagnosis of chorioamnionitis was determined on the basis of maternal fever (body temperature ≥ 38° C) or at least two of the following clinical criteria: maternal tachycardia (pulse rate ≥ 100 per min.), uterine tenderness, foul smelling amniotic fluid, fetal tachycardia (fetal heart rate > 160 beats per min.), with or without maternal leukocytosis (white blood cell ≥ 15,000 cell/mm3).[2,3,6] Premature rupture of membranes (PROM) is defined as rupture of membranes before onset of labor pain. Spontaneous rupture of membranes (SRM) is defined as rupture of membranes at or after onset of labor pain. Latency period is defined as the time from rupture of membranes or onset of labor pain to delivery.

The following variables were extracted form the chart records: maternal age, gravida, parity, gestational age, total antenatal care visits, total weight gain, number of fetuses, serology, cause of infection, route of delivery and outcomes. The outcomes of study were maternal and neonatal morbidity and mortality.

Data were analyzed by descriptive statistics.

Results

The total number of deliveries amounted to 63,219 cases between 1994 and 1998. Chorioamnionitis occurred in 151 cases. Hence, the incidence of chorioamnionitis was 2.4 per 1000 deliveries. Obstetrics characteristics of the cases diagnosed as chorioamnionitis are shown in table 1. Ninety nine cases (65.6%) received antenatal care at King Chulalongkorn Memorial Hospital. Thirteen cases (10.6%) had not received antenatal care. There were 2(1.3%), 11(7.3%) and 11(7.3%) cases positive for VDRL, HBsAg and anti-HIV, respectively.

Seventy four cases (49%) of chorioamnionitis occurred in premature rupture of membranes, and 26 cases (17.2%) occurred with spontaneous rupture of membranes. (Fig. 1)

Antibiotics were used when chorioamnionitis was diagnosed. The most commonly used antibiotics were ampicillin combined with gentamicin as shown in Fig 2. The routes of delivery are shown in Fig 3. The most common route of delivery was cesarean section,which its most common indication was an unfavorable cervix (Fig.4).

Maternal outcomes are shown in table 2. There were no intrapartum maternal complications but postpartum complications occurred in 10 cases (6.6%). All postpartum complications were endometritis. There was no maternal death.

Neonatal outcomes are shown in table 3. Neonatal death and complications occurred in 4 cases (2.6%) and 63 cases (41.7%), respectively. Neonatal complications are shown in table 4. The most common neonatal complications were infection.

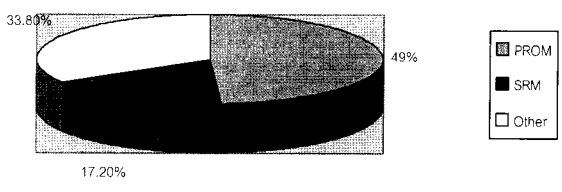


Fig. 1. Risk factors of chorioamnionitis (n=151)

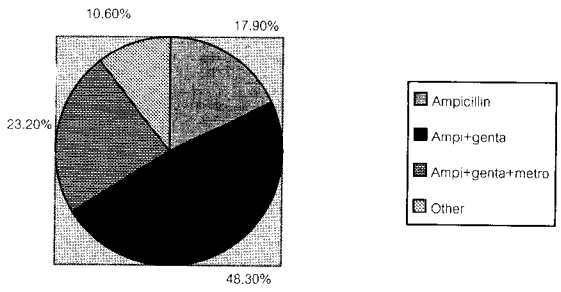


Fig. 2. Type of antibiotics (n=151)

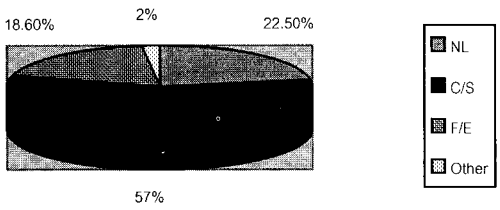


Fig. 3. Route of delivery (n=151)

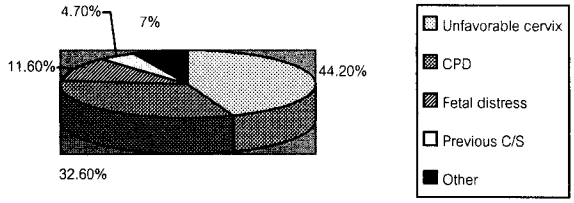


Fig. 4. Indications for cesarean section (N=86)

Table 1. Maternal and obstetrics characteristics

	Mean ± SD	Range
Age (years)	25.3±5.5	14-42
Gestational age (weeks)	36.5±3.7	28-42
Gravida (median)	1	1-5
Parity (median)	0	0-3
Total ANC visits	6.2±3.5	0-15
Total weight gain (kgs.)	11.5±4.8	2.5-25

Table 2. Maternal outcomes

	Mean ± SD	Range
Hospital stay (days)	8.2±3.7	3-30
Latency period (hours)	51.4±124.5	1.9-936.7
Fever (body temperature ≥ 38° C) (days)	2.1±1.7	1-12
Complication: endometritis	10 cases (6.6%)	

Table 3. Neonatal outcomes

	Mean ± SD	Range
Birth weight (g)	3671.2±695.9	600-4120
Apgar at 1 min	7.5±2.2	0-9
Apgar at 5 min	9.1±1.8	0-10
Total admission day (days)	10.5±12.4	1-86
NICU admission day (days)	1.9±5.9	0-48

Table 4. Neonatal complications (n=151)

	Cases (%)
❑ Infection *	36(23.8%)
Pneumonia	19(12.6%)
Sepsis	11(7.3%)
Diarrhea	4(2.6%)
Meningitis	3(2%)
❑ NEC (Necrotizing enterocolitis)	1(0.7%)
❑ RDS (Respiratory distress syndrome)	5(3.3%)
❑ IVH (Intraventricular hemorrhage)	3(2%)

* some cases had more than one kind of infection

Discussion

In our present study, the incidence of chorioamnionitis is 2.4 per 1000 deliveries which is below that stated by previous reports showing an incidence of 0.5-10.5% of all deliveries.[2-8] This difference may be due to individual differences as to in the prevalence of risk factors and the criteria of diagnosis.

The mean latency period of our patients was 51.4 hours. This may be a predisposing factor for the development of chorioamnionitis in our cases. Previous reports have shown that prolonged labor, prolonged rupture of membranes, multiple vaginal examinations were risk factors for the development of chorioamnionitis.[4,9] Our study has confimed prolonged labor, prolonged rupture of membranes were risk factors

Most of our cases (49%) occurred from PROM, thus confirming the report by Newton as to an increased risk of chorioamnionitis with PROM.[1]

When chorioamnionitis was recognized, broad-spectrum antibiotic therapy was initiated as reported by others.[2,6] It reduces additional maternal infectious morbidity to a minimum[1] and decreases the incidence of neonatal sepsis.[10,11] The antibiotics used in our study were ampicillin plus gentamicin or ampicillin plus gentamicin plus metronidazole account for 48.3% and 23.2% of the cases, respectively. We used this regimen because ampicillin and gentamicin cross the placenta rapidly and hence, have the highest cord blood level/maternal level ratio.[6,12] This regimen is similar to that reported by Newton on the use of ampicillin plus gentamicin. Contrast with Newton, we add metronidazole instead of clindamycin in patients undergoing a cesarean section[1] because metronidazole can cover anaerobic organisms.

Fifty seven percent of our cases were delivered by cesarean section reminiscent of the report by Newton[1] in that chorioamnionitis is associated with a higher incidence of labor abnormalities, oxytocin augmentation and cesarean section rate. Satin et al[13] have also found that the rate of cesarean section due to dystocia was markedly increased in chorioamnionitis. Our cesarean section cases were performed by transperitoneal technique. In the past, extraperitoneal cesarean section has been recommended in order to reduce surgical and infectious complications.[1] But, recently, the use of extraperitoneal cesarean section has not been found to reduce major complications compared with traditional transperitoneal cesarean section.[2] In our study, we found less maternal morbidity among cesarean section cases.

Maternal morbidity occurred among 6.6% of the present study. All of those were postpartum endometritis, less than in previous reports on choriomnionitis accounting for 10-40% of febrile morbidity in the peripartum period.[1,14] In the past, there has been high maternal mortality due to

chorioamnionitis, but recently this has rarely occurred.[2] In previous reports,[7,14,15] as well as our present study, there has been no maternal mortality.

We found neonatal morbidity and mortality of 41.7% and 2.6%, respectively. The most common neonatal complications were infection, especially pneumonia and sepsis as previously reported.[6,7,16] Pneumonia and sepsis were found in12.6% and 7.3%, respectively. Hence, our study was within the range of previous reports in that pneumonia and sepsis occurred in 2-25% and 4.1-28%, respectively.[8,17] The neonatal death rate also increased in the presence of chorioamnionitis.[15] Neonatal death occurred in 2-25% according to previous reports[8,17] which is consistent with the rate of 2.6% in our study. Neonatal morbidity and mortality also increased in preterm neonates.

In conclusion, eventhough there were no maternal mortality and low maternal morbidity, neonatal morbidity was still high. As most cases of chorioamnionitis occurred in PROM, improved strategies for management of PROM may reduce the incidence of chorioamniontis and neonatal morbidity.

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