THE OBSTETRIC OUTCOMES AMONG PRIMIPARITY AND MULTIPARITY ON EPIDURAL ANALGESIA IN HOSPITAL UNIVERSITI SAINS MALAYSIA

By

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ABBREVIATIONS

&	And
%	Percentage
µg	microgram
ANC	Antenatal clinic
ANOVA	Analysis of variance
APH	Antepartum Heamorrhage
ARM	Artificial rupture of membrane
AS	Apgar score
BP	Blood pressure
CEMM	Confidential Enquiry In Maternal Mortality
CI	Confidence interval
cm	centimeter
cm	Centimeter
CMS	Continuous midwifery support
CRF	Clinical Research Form
C-Section	Caesarean Section
CTG	Cardiotocogram
DM	Diabetes mellitus
ECG	Electrocardiotocogram
EMM	Estimated marginal means
g	Gram
GA	Gestational age

GDM	Gestational Diabetes Mellitus
HDU	High dependency unit
HUSM	Hospital University Sains Malaysia
ID	Instrumental delivery
IM	Intramuscular
IQ	Interquartile (hour)
IUGR	Intra uterine growth restriction
IV	Intravenous
Kg	Kilogram
LSCS	Lower segment caesarean section
mA	Milli ampule
MC	Multiparity Control
ME	Multiparity Epidural
mg	Milligram
mIU	milliliter International Units
ml	milliliter
mmHg	Millimeter mercury
MMR	Maternal mortality rate
MOD	Mode of delivery
MRP	Manual removal of placenta
NICU	Neonatal Intensive care Units
NND	Neonatal Death
OR	Odds ratio

PC	Primiparity Control
PCA	Patient control analgesia
PE	Primiparity Epidural
PIH	Pregnancy Induced Hypertension
POA	Period of amenorrhea (weeks)
RCT	Randomize controlled trial
SD	Standard deviation
SPL	Spontaneous onset of labour
SVD	Spontaneous Vagina Delivery
TENS	Transcutaneous electric nerve stimulation
USM	Universiti Sains Malaysia
VRS	Verbal rating scale
WMD	Weighted mean difference (adjusted mean)

ABSTRACT

ABSTRAK (VERSI BAHASA MELAYU)

Objektif

Mengenalpasti kesan obstetrik bagi pesakit epidural bagi kelahiran kandungan pertama(Primpariti) dan ke atas (Multipariti) di Hospital Universiti Sains Malaysia.

Metodologi

Kajian kes keratan rentas ke atas ibu-ibu mengandung yang menggunakan epidural sebagai ubatan untuk menahan kesakitan ketika bersalin. Ia melibatkan ibu-ibu mengandung untuk kelahiran anak pertama(primiparti) dan ke atas (multipariti) yang menggunakan epidural semasa kelahiran anak. Seramai 124 pesakit dari anak kelahiran pertama dan 124 lagi kumpulan dari kumpulan pesakit yang mempunyai kelahiran kedua dan ke atas. Bagi kes kontrol pula, seramai 248 pesakit yang mengambil ubatan selain daripada epidural seperti injiksi pethidine untuk menahan sakit kelahiran anak. Mereka juga dibahagi kepada dua kumpulan iaitu kelahiran anak pertama dan kelahiran anak kedua dan keatas. Kajian ini dijalankan di Hospital Universiti Sains Malaysia. Tujuan kajian ialah untuk mengenalpasti kesan obstetrik bagi kesemua kumpulan tersebut seperti jangka masa kelahiran aktif sehingga bukaan servik penuh, jangka masa ketika bayi dilahirkan, jenis-jenis kelahiran serta kesan-kesan yang berkaitan dengan epidural.

Kesemua pesakit yang diambil untuk kajian ini diambilkira semasa masuk ke dewan bersalin dan mempunyai bukaan servik antara 3 dan 4 sentimeter bagi pesakit yang mengambil epidural dan tidak mengambil epidural. Ukuran masa yang diambil ialah dari masa air ketuban dipecahkan sehingga bukaan servik 10 sentimeter dan dari masa bukaan ini sehingga kelahiran bayi dan dari kelahiran bayi sehingga uri dikeluarkan. Selain dari itu jenis-jenis kelahiran akan diambil kira

seperti jumlah kelahiran secara biasa, pembedahan, serta menggunakan alat bantuan kelahiran seperti forsep dan vakum. Bagi bayi yang dilahirkan, 'Apgar score' diambil kira , kurang dari 7 atau lebih dari 7 pada minit pertama dan ke lima , pengambilan ubatan 'naloxone' untuk mencegah kesan ubatan opiods serta kemasukan ke NICU bagi bayi yang dilahirkan.

Keputusan

Seramai 499 orng pesakit diambil dalam kajian ini. Ia merangkumi 124(24.8%) untuk setiap kumpulan 'Primiparity'(PE) dan 'Multiparity'(ME) Epidural. Seramai 124(24.8%) lagi dari kumpulan 'Primiparity' control (PC) dan 127 (25.5%) dari Multiparity control(MC).

Kajian ini menunjukkan jangkamasa kelahiran aktif (first stage) yang bermula dari bukaan servik 3-4 sentimeter hingga bukaan penuh ialah 424.72 $\pm$165.70 dan 344.61 (142.14) minit bag kumpulan PE dan ME. Bagi kumpulan yang tidak mengambil epidural pula, untuk kelahiran pertama ialah 327.22(175.35) dan kelahiran ke atas ialah 263.56 (139.75)minit masing-masing. Ia juga menunjukkan perbezaan yang signifikan dalam jangkamasa 'first stage' antara kumpulan yang mengambil epidural dan tiada epidural masing-masing 384.67 $\pm$ 129.20 dan 295.01 $\pm$161.21 dengan $p < 0.001$.

Statistika multivariat menunjukkan ada perkaitan (association) antara penggunaan epidural dan parity dengan 'adjusted mean' 375.98(95% CI 356.47,395.49) dan 304.08(95% CI 284.69, 323.48). Walaubagaimanpun tiada kesan interaksi antara kesan epidural dan parity iaitu $p=0.557$.

Perbandingan jangkamasa kelahiran bayi(second stage) dari bukaan servik 10 sentimeter sehingga bayi lahir menunjukkan jangkamasa 'second stage' kumpulan PE adalah 36% lebih berbanding kumpulan ME, (21.45 $\pm$ 22.31 dan 13.82 $\pm$ 14.03). Tiada perbezaan signifikan antara kumpulan yang menggunakan epidural (17.64, $\pm$ 18.98) dan kumpulan yang tidak mengambil epudiral (18.82 $\pm$ 17.83) , p=0.470. Jika hanya tahap kelahiran (parity) sahaja diambil kira tanpa perkaitan epidural, kumpulan kelahiran pertama menunjukan jangkamasa yang panjang iaitu 21.81(20.59) berbanding 14.69 (15.19), p= 0.001. Tiada perbezaan jangkamasa ketiga(third stage) antara kumpulan yang dikaji.

Kelahiran secara pembedahan 'LSCS' 30.6%(38) adalah dari kumpulan PE diikuti pula kumpulan ME iaitu 20.2% dan kumpulan PC dan MC masing-masing menunjukkan kadar pembedahan 'LSCS' antara 12.1% dan 7.1%. Kelahiran instrumentasi hanya terdapat pada PE dan PC iaitu 5.6%(7) dan 4.8%(6). Kumpulan yang mengambl epidural menunjukkan kadar tinggi untuk kelahiran pembedahan (LSCS) dan ia adalah signifikan,(25.4% dan 9.6%).

Insiden 'Spontaneous onset of labour (SPL) bagi PE dan ME adalah 60.5%-66.5% manakala bagi group kontrol ,PC dan MC insiden 'SPL' ialah 82.3% hingga 93.7%. 'SPL' merupakan presentasi yang signifikan bagi kumpulan yang tidak mengambil epidural iaitu 88.1% berbanding 63.7% bagi epidural. Pesakit yang mengalami 'SPL' lebih cenderung untuk kelahiran secara normal berbanding 'induced', p= 0.001. Analysis multivariate antara 'SPL' dan kegunaan epidural menunjukkan pesakit yang menggunakan epidural mempunyai risiko untuk kelahiran pembedahan sebanyak 2.5 kaliganda.

Penggunaan augmentasi oksitosin adalah lebih tinggi di dalam kumpulan PE dan ME (84.7% dan 71.0%). Sekaligus menunjukkan kesan penggunaan augmentasi lebih kerap dikalangan pesakit epidural iaitu 77.8% berbanding 55.4% pada kumpulan kontrol. Pesakit epidural berisiko sebanyak 2.8 kaliganda untuk augmentasi oksitosin.

Min gestasi (GA) ialah 39.21. Min berat kelahiran bayi ialah 3102 $\pm$ 438.76. Tiada perbezaan berat antara semua kumpulan dalam kajian. Tiada kaitan antara berat bayi yang dilahirkan dengan kesan epidural. Tiada kesan yang signifikan epidural terhadap bayi yang dilahirkan iaitu dari segi 'Apgar score' pada minit pertama dan ke lima. 'AS' pada minit pertama ialah antara 87.9% -97.6% dan pada minit ke lima antara 97%-99%. Terdapat peningkatan ubatan 'naloxone' terhadap bayi yang dilahirkan tanpa epidural akibat kesan ubatan 'pethidine', $p < 0.001$. Tiada kesan signifkan kemasukan bayi ke ICU.

Pesakit yang mengambil epidural menunjukkan kadar berpuas hati yang tinggi, ($p< 0.001$). Tiada kesan yang jelas pada komplikasi epidural untuk distribusi epidural tak sekata, badan yang berketar (shivering), tekanan darah yang kurang dari 90/50mmHg dan retensi urin selepas bersalin. Terdapat kadar peningkatan suhu badan pada kelahiran pertama, 16.1% dan 6.5% untuk kumpulan kedua. Kurangnya sensasi untuk meneran ketika 'second stage' lebih ramai dari kumpulan primipariti.

Kesimpulan

Penggunaan epidural boleh meningkatkan jangka masa kelahiran yang lebih panjang pada peringkat pertama dan kedua. Ia juga meningkatkan kelahiran secara pembedahan tetapi tidak meningkatkan penggunaan bantuan intrumentasi. Pesakit yang menpunyai simptom kelahiran spontan(SPL) menunjukkan kelahiran secara normal yang tinggi tetapi apabila penggunaan epidural ,terdapat peningkatan kelahiran secara pembedahan. Kadar augmentasi juga meningkat dalam kumpulan epidural. Tiada kesan terhadap bayi yang dilahirkan melalui epidural terhadap 'Apgar score' dan kemasukkan ke NICU . Lebih ramai bayi mendapat injeksi naloxone dari kumpulan yang menggunakan injeksi 'pethidine'. Tiada kesan komplikasi yang jelas terhadap bayi dengan pengguna epidural. Penggunaan epidural adalah selamat untuk ibu mengandung dan anak yang bakal dilahirkan.

ABSTRACT (ENGLISH VERSION)

Objective

To determine the obstetric outcomes of primiparity and multiparity who received epidural analgesia during labour in Hospital Universiti Sains Malaysia (HUSM).

Methodology

A cross sectional study involving 248 pregnant mothers, primiparity and multiparity, who received epidural analgesia (study group) and another 251 will received other methods of analgesia during intrapartum (control group) in HUSM from January 2007 to December 2008. All patient on epidural analgesia will be taken as a participant after consent is taken. The epidural analgesia will be performed by the anesthetic team. The patient will receive epidural analgesia (Ropivacaine 0.125% and fentanyl 0.2mg/ ml) once they are in labour. The duration of first stage of labour will be taken at the time of ARM after epidural analgesia was given till fully dilatation of cervix. Patient with the cervical dilatation of 3cm and 4 cm will be recruited into the study to avoid bias. The duration of second stage of labour will be taken from the time of active pushing at full dilatation of cervix until the fetus was expelled out. The duration of third stage of labour will be taken from the delivery of fetus until the placenta is delivered. All the duration taken will be calculated in minutes. The mode of delivery and the used of oxytocin augmentation will be evaluated and analyzed in both groups.

The neonatal outcomes reviewed were Apgar Score at one minute and five minutes, the requirement of naloxone to the baby and NICU admissions. The maternal complications were elicited from the time of epidural analgesia given till the next 24 hours.

Results

There were 499 patients in this study population which was well distributed consisting of 124(24.8%) patient for primiparity and 124(24.8%) multiparity on epidural and 124(24.8%) primiparity and 127(25.5%) multiparity for control group which used other method of analgesia such as IM Pethidine or Entonox.

There were significant different in mean duration first stage of labour between primiparity and multiparity of both epidural and non epidural groups($p < 0.001$). The mean duration of first stage of labour in PE was 424.72 ± 165.70 which was longer than ME group with mean duration of 344.61 ± 142.14 minutes. The control group PC and MC showed shorter mean duration of first stage of labour which were 327.22 ± 175.35 and 263.56 ± 139.75 minutes respectively. Comparing between epidural and non epidural group, there was significant longer in the mean duration of first stage of labour with $p < 0.001$ which were 384.67 ± 159.20 versus 295.01 ± 161.21 minutes. There was also significant association between epidural and parity , the epidural group and parity have a longer duration first stage of labour with adjusted means 375.98 (95% CI 356.47, 395.49) and 304.08 (95% CI 284.69, 323.48) minutes comparing to each group with $p= 0.001$. However, there was no significant interaction in mean duration first stage of labour between epidural and parity .

In second stage of labour the PE group showed significantly longer mean duration of second stage of labour than ME (21.45 ± 22.31 versus 13.82 ± 14.03) minutes. Similarly, the duration of second stage of labour was prolonged in PC as compared to MC. There was no significant different in mean second stage of labour between epidural group and controlled group with

(p = 0.470) and no significant association in mean second stage of labour in epidural with parity, (p =0.451). There was significant association between primiparity and multiparity group, with adjusted mean 21.82 minutes and 14.68 with $p < 0.001$. However, there was no significant interaction between the use of analgesia and parity, $p = 0.759$.

There was no significant different in mean duration third stage of labour.

In mode of delivery, LSCS was highest among the PE (30.6%) followed by ME (20.2%), PC (12.1%) and MC (7.1%). LSCS was significantly higher in epidural group compared to controlled group , ($p < 0.001$). There were no significant different in number of ID in both primiparity and multiparity groups as well as in epidural and non-epidural group.

The incidence of Spontaneous Onset of Labour (SPL) was significantly low in PE and ME (60.5% and 66.5%) compared to controlled groups (82.3% and 93.7%). There was significantly low incidence of SPL in epidural group than controlled groups (63.7% versus 88.1%), $p < 0.001$. SPL is likely to have SVD compared to induced labour (82.8% versus 64%). The incidence of LSCS followed by SPL and induced labour was 12.4% versus 33.3%.. In multivariate analysis there was significant association between spontaneous vaginal delivery and usage of epidural ($p <0.001$). Patient who had spontaneous onset of labour less likely to go for cesarean section with OR = 0.37 and Epidural usage has 2.5 times risk for cesarean section. There was no significant interaction between spontaneous onset of labour and used of epidural $p= 0.502$.

PE had the highest usage of oxytocin augmentation 84.7%(105) versus ME = 71.0%(88). Epidural group has higher percentage of augmentation , 77.8% (193) compared to control group , 55.4%(139) with $p<0.001$ in which majority of them required mild to moderate dosage. The epidural group has 2.83 times of having augmentation of labour. However more patient on epidural group required higher dose of oxytocin (16.1% versus 9.4%).

In neonatal outcomes, the overall mean of GA was 39.21 ± 1.30 weeks. There was no difference in mean GA in each group from this study. The mean birth weight in this study population was 3102 ± 438.76 in g. In the epidural group AS > 7 at 1 minutes were noted 87.9% and 97.6% for primiparity and multiparity respectively while in control group, the AS > 7 at 1 minutes was 92.7% and 97.6%. . AS at 5 minutes showed an improvement in both groups ranging from 97% to 99%. There was no significant different in apgar score at one and five minutes between epidural and control group.

Naloxone was significantly used in control groups. About 60.6% of control group required Naloxone at birth of baby as compared to Epidural group (5.2%), $p < 0.001$. There was no significant different of NICU admission between Epidural and control group, $p = 0.300$. This indicates that the use of epidural analgesia did not given any harm to the neonates.

In relation to complication of epidural, loss of pushing sensation were more common in Primiparity , 28.2% as compared to Multiparity 16.9%. There was no different of unequal distribution between primiparity and multiparity (14.5% versus 13.7%). Increased in maternal temperature was noted to be higher primiparity than multiparity (16.1% versus 6.5%) although not statistically significant. Headache , hypotension, post partum urinary retention and shivering

occurred in small numbers of patient on epidural and was not statistically significant. Primiparity had higher back pain , 41.9%(52) as compared to 29% (36) from multiparity and statistically significant. About 95.5% of mother were satisfied with the epidural analgesia administration and may be due to good pain relief and less stress and anxiety while waiting for delivery.

Conclusions

There was significant longer first stage and second stage in the as compared to epidural non epidural group. There was significant association between usage of epidural and parity in duration of first stage and second stage of labour but no further statistical significant in the interaction between usage of epidural and parity after adjustment the main effect of parity. The epidural group has significant higher rate of cesarean section as compared to non epidural group with and poor progress of labour was the most common indication. There was no significant different in instrumental delivery. Spontaneous onset of labour had increased risk of cesarean section rate in Epidural group with OR= 2.50. Epidural analgesia had 2.8 fold for oxytocin augmentation. There was no significant different in Apgar score of > 7 at one minutes and five minutes in both groups. The used of naloxone was higher in non epidural group. Epidural analgesia gave a very good satisfaction for superior pain relief in 96% of delivered mother. There were no significant morbidity and mortality in the mothers and neonates. Epidural analgesia is very effective for pain relief and very safe.

INTRODUCTION

1. INTRODUCTION

1.1.INTRODUCTION TO THE STATE OF KELANTAN

1.1.1 Kelantan State

Kelantan is one of the 13 states in Malaysia, bordered by Thailand on the north, isolated from the west by a chain of rugged mountains and separated from the south by the oil rich state of Terengganu.

Kelantan is situated in the north eastern part of Peninsula Malaysia and covers a land of 14,922 square kilometres. Kelantan consists of ten districts namely Kota Bharu, Bachok, Machang, Pasir Puteh, Pasir Mas, Tanah Merah, Tumpat, Kuala Krai, Jeli and Gua Musang. The state capital Kota Bharu is located on the banks of the Kelantan River and situated 627 kilometres from the federal capital, Kuala Lumpur. Kota Bharu was granted the title "Darul Naim" which means "the peaceful state" in July 1916.

The population of Kelantan is 1.4 million people in the last population census done in 2004, with an annual growth rate of 2.6% per year. The distribution of the population differs from one district to another with 86% of the population living in the northern district (except Kuala Krai and Gua Musang) which contribute only about 26% of the total land area. The majority of its population is predominantly Malay, constituting 93%, while the Chinese, Indian and Siamese make up for the other 7% of the total population.

The Kelantan gross economic product has grown steadily. The Government Domestic Product (GDP) grew from RM 1,463 million in 1985 to RM 2,485 million in 1993. This growth has been attributed to a strong commitment by both the public and private sector. The per capita income in 1995 was RM 2,081. The economics growth rate for 1994 -1995 is 6.4%. Agriculture and fishing industries are the backbone of the Kelantan economy, accounting for about 35% of the state GDP in the past years. The opening of East-West Highway, bringing Kelantan into closer contact with the west coast, promises to accelerate the state's economic development.

With its rich cultural and traditional heritage, Kelantan is one of the most interesting and unique destinations for a vacation. The long stretches of clean sparkling white virgin beaches, with the blue seas in the background are ideal for swimming and picnicking. Kelantan's traditional pastimes of top spinning, kite flying, drum beating and traditional singing (Dikir Barat) are well known and alive in spite of the modernization of its people. The handicrafts are superb, for example the hand printed "*batik*" cloth, "*songket*" and exquisite silverware are renowned and popular with tourists, whether local or foreign. The craftsperson's of Kelantan are truly gifted and skilled and are a tribute to Kelantan's rich cultural heritage, living up to its reputation as the "***soul of Malaysia***".

1.1.2. Maternal Health Care In Kelantan

Maternal health care in Kelantan is part of the government health care services provided by the Malaysian Ministry of Health.

The medical and health services for the state are provided by ten hospitals. One is HUSM which is a university hospital & tertiary referral for the east coast of the Malaysian Peninsular. The other hospital is Hospital Raja Perempuan Zainab 2 which is a large government hospital. Bachok which is situated near Kota Bharu is served by these 2 large hospitals. Each of the other 8 districts has a local district hospital.

Improvement in the medical and health services in the state is clearly reflected by the increasing number of hospital deliveries, and a reduction in Perinatal and Maternal Mortality.

The Maternal Mortality Rate (MMR) in Kelantan has declined from 52/100,000 live births in 1991 to 33.8/100,000 live births in 2000. There were 22 maternal deaths in 1991 and 12 maternal deaths in 2000. The Kelantan MMR compared to the other states in Malaysia (Sabah, Trengganu and N. Sembilan) were almost similar.

The districts with the highest mortality rates in 1997 were Gua Musang and Machang where the MMRs, were 86.4 and 80.6/100,000 live births (CEMM, Malaysia, 2002).

1.2 THE UNIVERSITI SAINS MALAYSIA HOSPITAL (HUSM)

1.2.1 The Hospital

The School of Medical Sciences, Universiti Sains Malaysia (USM) is the third university set up in Malaysia after the Medical School of Malaya and University Kebangsaan Malaysia.Hospital Universiti Sains Malaysia (HUSM) is the teaching hospital and referral central for the state of Kelantan and the state of east coast. It is located about 6.4km from the town of Kota Bharu.

Services offered by HUSM can be categorized into two, namely the outpatient service and the in-patient service. The Outpatient Service consists of:

1. Community Medicine Clinic that is open on working days from 8.20 am– 4.40 pm.
2. Specialist clinics in all departments that is open from Sunday to Thursday and to see cases by referrals and appointments.
3. Accident and Emergency Unit that is open round the clock to attend to all kinds of urgent cases.
4. Dental clinic

The Universiti Sains Malaysia Hospital has twenty eight inpatient wards and provides services for different disciplines.

Support services come from the many departments and units that make up this hospital. Services from the Radiology Department, Nuclear Medicine Unit and Laboratories help doctors to decide the best treatment regime for patients. The blood bank supplies blood and blood components as well as other haematological tests and screening. The Therapy Unit and the Haemodialysis Unit

provides the necessary therapies for specific patients. The Dietetics Unit prepares food for all in patients and provides diet counselling services. The Laundry Unit ensures constant supply of linen to the wards while the Housekeeping Unit is responsible for the cleanliness of all general areas in the hospital.

1.2.2 The Department of Obstetric and Gynaecology, HUSM.

In year 2007, the department of Obstetrics and Gynaecology was staffed by two consultants, ten specialists/lecturers, seven registrars (final year master students), twenty medical officers/trainee lecturers and seven house officers. The postgraduate program was started in 1991 and the first Master of Medicine in Obstetric and Gynaecology candidates graduated in June 1995.

Initially, the department of Obstetrics and Gynaecology occupied the first and second floors of the main hospital building. There is one gynaecology ward on the first floor with 35 beds and two obstetrics wards on the second floor with 40 antenatal beds and 40 postnatal beds.

The department changed quarters in 1997. The new block has a Labour Room, the antenatal ward and the postnatal ward. The Labour Room (1 Berlian) is currently on the first floor of the new block. It consists of 5 labour suites (low-risk delivery), 2 epidural rooms, 1 high dependent room (HDU), I "USAINS" (package) room,1 admission room, a 2 bedded pre-eclampsia rooms for patients requiring intensive care, a 2 bedded premature Labour Room, 1 operating theatre and 3 ultrasound rooms. This floor became fully operational in June 1997.

The Labour Room is equipped with ultrasound machines, cardiotocography (CTG) machine, dynamaps, ECG monitors, infusion pumps, two resuscitation trolleys and a central oxygen supply and blood warmer.

Adjacent to the Labour Room is the neonatal resuscitation room which is equipped with a resuscitation trolley, warmer and incubators. There is an operation theatre situated within the Labour Room, which is open during office hours for emergency obstetrics procedures such as caesarean section and repair of third and fourth degree vaginal / cervical tears and manual removal of placenta.

There is an anesthetic medical officer posted to the Labour Room during office hours to provide epidural service and emergency procedures. The Neonatal Intensive Care Unit (NICU) is located behind the Labour Room and is equipped with facilities for the care of problematic newborns. There are two specialists, one registrar and two medical officers in charge of the Labour Room during office hours. After office hours, the on call team with an average of three to four persons including a medical officer, a registrar and one specialist on call look after the patients in the Labour Room, the antenatal and the gynaecology wards.

The total numbers of delivery was in between 6500 to 7125 per year from 2002 to 2008. Whereas the total live birth rate was between 6505 to 7032 per year and still birth rate was in between 69 to 89 per year. The mode of delivery was SVD, instrumental delivery and caesarean delivery. The SVD almost constant throughout several years however caesarean delivery showed increasing in numbers from 1080 in 2002 to 1290 in 2008 (Table 1.2.1)

Table 1.2.1 : The Number of Delivery, Mode of Delivery, Stillbirth, Live Birth and Maternal Mortality Rate in HUSM from 2002 to 2008

Year	2002	2003	2004	2005	2006	2007	2008
Total Deliveries	7125	6588	6562	6914	6966	6805	6907
Total live birth	7032	6505	6487	6829	6897	6730	6835
Total still birth	89	83	75	85	69	75	73
Mode Of Deliveries (%)							
1. SVD	5663	5144	5017	5402	5386	5312	5313
2. Vacuum	159	202	114	129	130	79	109
3. Forceps	89	62	106	79	50	38	50
4. LSCS	1080	1052	1189	1191	1286	1307	1290
5. Breech	134	129	137	113	111	95	96
MMR(per 1000 live births)	5	3	3	2	0	8	2

The antenatal wards (2 Baiduri and 2 Arked) are situated on the 2nd floor and has 20 beds each and the postnatal ward (2 Topaz) has 40 beds. The gynaecology wards were shifted to the 1st floor of the old hospital block and have a total of 36 beds.

The Obstetrics and Gynaecology clinic is situated on the ground floor of the same building, and is equipped with two-ultrasound machines and one colposcopy and fibreoptic hysteroscopy. The clinic is managed by four team which consist an average of 6-7 medical officers per team and it runs as shown in table 1.2.2.

Table 1.2.2 : The Schedule of Obstetrics and Gynaecology Clinics of HUSM

DAY	MORNING	AFTRERNOON
Sunday	ANC team A&B, Detail Scan	Gynaecology clinic team A&B
Monday	Combined clinic/menopause clinic	Molar clinic Colposcopy team C&D
Tuesday	ANC team C&D	Gynaecology clinic team C&D
Wednesday	Infertility clinic	Post natal clinic Colposcopy team A&B
Thursday	Antenatal Booking clinic	-

The doctors manage these clinics along with ward duties during normal working days as well as on call days. This system works well.

1.3 INTRODUCTION OF THE STUDY

1.3.1 Labour Stages and Types of Analgesia

Labour is a strenuous process in woman who undergoing parturition. It is a dynamic process which involves myometrial contraction, cervical ripening and dilatation and at the end of the process are expulsion of fetus and delivery of placenta. The diagnosis of labour can be made when there is regular and painful contraction of more than 2 times in 10 minutes, descent of head, effacement and dilation of the cervix. Although labour is a continuous process, it is divided into three stages for the purpose of management. The stages are first stage of labour, second stage of labour and third stage of labour.

The first stage is also defined as active phase of labour where the dilatation of cervix is ≥ 3 centimeter (cm) with the contraction of ≥ 2 in 10 minutes until the full cervical dilation of 10 cm. The process of first stage of labour is described graphically into partogram which has two lines ; alert and action lines, where the cervical dilation , decents of presenting part, frequency of uterine contraction, fetal heart rate and maternal vital signs (appendix 5). The partogram can give an idea of labour progress; when the rate of cervical dilation slower than mean or below tenth centile it shows a poor progress of labour. The intervention must be considered such as starting of augmentation (Studd et al, 1975; Cordozo et al, 1982) and continue monitoring of progression. The length of first stage of labour in primiparous is up to 12 hours and for multiparous is 8 hours in which the intervention should be taken beyond this time to reduce complications to mother and fetal morbidity as well as mortality (Arulkumaran et al.,1996).

The second stage of labour last from the end of first stage; when the cervix has reach the full dilatation to the birth of baby. Fetus (Aitkenhead et al., 2001) subjected to stressful conditions at this stage where it can progress to hypoxia which is indicated by fetal heart rate pattern.

Therefore, careful evaluation of fetal heart rate and duration are crucial and appropriate intervention should be taken such as instrumental delivery or operative abdominal delivery. The duration of second stage is important but remains controversial with regard to what action is to institute and when; particularly when epidural analgesia is used. There are two phases of second stage, pelvic phase where the descends of head enter the mid pelvis through the pelvic wall and perineal phase where the descends head reach the perineum with bearing down sensation. Philpott and Castle (1972) and Studd (1973) concluded that 45 minutes for primiparous and 15 minutes for multiparous represent the normal second stage. Some guidelines said if the onset of second stage is identified in the pelvic phase with epidural analgesia used the duration can be 1 to 3 hour for uterine contractions to effect the descent of the head. If one hour of good uterine contractions and no head descends, bearing down should be encouraged. An arbitrary limit of one hour may be taken for multiparous who are not on epidural analgesia (Paterson et al., 1992). The contention that epidural analgesia prolongs the second stage is mainly base on the fact that epidural analgesia causes pelvic floor muscle relaxation and interrupts Ferguson's reflex. In this study, to standardize the duration, the prolonged second stage of labour is considered as one hour of active pushing before the intervention of instrumental delivery undertaken (Aitkenhead et al., 2001).

Third stage of labour started from the delivery of fetus completely until the delivery of placenta. At this stage the active management should be done in which injection of syntometrin or syntocinon given at delivery of anterior shoulder, controlled cord traction and delayed cord clamping. The maximum duration of third stage is 30 minutes and if placenta cannot be delivered, manual removal of placenta should be considered.

1.3.2 Physiology of Labour Pain

Labour pain is made of visceral and somatic components. The visceral components involved the distension of cervix and the lower uterine segment during the first stage of labour contractions. The pain will be felt when the intrauterine pressure exceed 25 mmHg. Myometrial and cervical ischemia during contraction may also cause pain. Visceral pain is transmitted by Aδ and C fibres which runs together with sympathetic fibres eventually passing through the hypogastric plexus into main sympathetic chains. From sympathetic chain fibres its entered the white rami comunicantes associated with T10-T12 and L1 spinal nerves and pass via their posterior nerve roots to synapse in the dorsal horn of spinal cord.

Early labour pain is referred to T11-T12 dermatomes so that the pain is felt in lower abdomen and back. At this early stage of labour the pain is dull, predominantly C fibre transmitted and sensitive to opiod drugs. In the active first stage of labour , uterine contraction become more intense, sharp and spread to adjacent dermatomes, T10-L1. The sharper pain is predominantly Aδ fibre transmission and more opiods resistance. Stretching and distension of pelvic floor, vagina and perineum in late first stage and second stage of labour causes somatic pain which is transmitted via pudendal nerve S2-S4 and also opiods resistant.

The above labour pain pathways can give us the clues on types of labour pain or specific nerve block such as paracervical, lumbar symphathetic, paravetebral and pudendal can modify pain transmission at different levels.

Several methods have been used to relief the labour pain such as non-systemic analgesia, systemic analgesia and regional analgesia. In non-systemic analgesia such as Transcutaneuos electric nerve stimulation (TENS) which are applied at the lower back of each sites of vertebral column with pulsatile electric current which varies from 0-40 mA at frequency of 40-150Hz. It act by gate control theory of pain. However, it was reported that there is no difference in pain intensity comparing in TENS and no TENS. The other methods are water therapy, aroma therapy and acupuncture.

Entonox (50% nitrous oxide, 50% oxygen) is an inhalational agent used in obstetric analgesia. However, its analgesic property is limited. Some study showed entonox can reduced labour pain 30-40%. Patient is required to inhaled the entonox from the starting of contraction until the maximum contraction pain ease to achieve the analgesics effect.

Systemic analgesia are widely used for labour pain despite their side effects and lack of efficacy. They are opiods such as Pethidine administered intramuscularly in a dose of 1.0-1.5mg/kg up to a maximum of 150mg, Patient controlled intravenous analgesia (PCA), Fentanyl, Diamorphine and ultra short acting opiods (Remifentanil) .

Last but not least, the regional analgesia in labour which is lumbar epidural inserted into the dural space continuously promise a better pain relief of all above analgesia. An epidural block using an indwelling catheter is the most flexible of all techniques in which can give complete analgesia through labour with being able to extended for emergency caesarean section. Epidural analgesia also can modified the widespread neuroendocrine physiological stress response of labour including:

- Increased oxygen consumption, hyperventilation and respiratory alkalosis.
- Increased cardiac output, systemic vascular resistance and arterial blood pressure.
- Delayed gastric emptying.

1.3.3 Epidural Analgesia and The Main Benefit

Epidural analgesia is a central nerve block technique achieved by injection of local anesthetic close to the nerve that transmits pain. It is widely used as a form of pain relief in labour. The epidural was given by a trained anesthetist by injecting the local anesthetics drugs through the indwelling catheter such as "Bupivacaine" ,"Ropivacaine" and "Fentanyl" in the epidural space between the level of Lumbar 1-2 or Lumbar 3-4 (See appendix 1).

Epidural analgesia is the most effective labour analgesia so far even though some patient preferred other methods of controlling pain such as breathing, focusing and relaxation techniques. About 70%- 80% of pregnant mother request for epidural as pain relief, as it can relief the labour pain, allow time for rest, reduce hyperventilation and worries for mother, good for mother with pregnancy induced hypertension (PIH) in controlling the blood pressure and some uncomplicated heart disease mother. Despite the best control of labour pain, its has been associated with some obstetric consequences, such as increase risks of prolong labour, instrumental delivery for prolong second stage of labour, unequal distribution of analgesia during continuation of epidural infusions or blotchy, may cause shivering, possible headache (with dura puncture), possible back ache, possible hypotension (requires intravenous fluids (IV) or rehydration) , postpartum urinary retention and elevation of mother's temperature, mild itching of face, neck and thorax , and may cause septic meningitis.

There are increased need for oxytocin augmentation , incidence of caesarean section and instrumental delivery. Epidural analgesia may also hamper 'push-ability' and may cause delay babies early 'latch-on' ability to breast feed (Aitkenhead et al., 2001).

In epidural analgesia maternal satisfaction is difficult to be defined and measured. Some mothers would become satisfied if they don't have any complications on their baby and themselves than provision of effective analgesia. Maternal opinion of pain may also be influenced by parity, instrumental delivery and length of labour. In this study the verbal rating scale (VRS) is a simple, valid and reliable . It is used to measure the pain score in these study.

The main benefit of epidural analgesia as follow:

1. Supreme analgesia for mother which can reduce progressive fetal acidosis in long painful labour as compared to mother with opiods analgesia.
2. Reduce maternal circulating catecholamine level, maternal oxygen demands of labour and delivery which were important in preeclampsia (PE), impaired uteroplacenta perfusion and important for mother with heart disease in whom impaired or fixed cardiac output.
3. Facilitates manipulation and episiotomy especially in multiple pregnancy and manual removal of placenta (MRP).
4. Readily converted to regional anesthesia in high risks patient of caesarean section such as previous scar, APH , DM, preeclampsia and multiple pregnancy.
5. Reduce premature urge to push before cervix fully dilated especially in preterm and those with thickened anterior cervical lips.

There are several conditions where patients are contraindicated to undergo epidural analgesia. Example of these condition are bleeding disorder or on anticoagulants, infection around the area of epidural injection , severe thrombocytopenia and patient refusal. Patients with heart disease in pregnancy. Patient with severe pulmonary hypertension and relatively fixed cardiac output such as aortic stenosis or obstructive cardiomyopathy are contraindicated.

1.3.4 Prevalence of Epidural Analgesia in HUSM

In HUSM , epidural is used in about 120-150 patients in labour each year. The distribution of range is almost equal between primigravida and multigravida . For example in year 2005, epidural was given in 76 patients of primigravida and 73 of mutigravida. There were no specific data on the outcome of patient irrespective to mode of delivery such as spontaneous vagina, caesarean section or instrumental delivery. The small number of epidural used in HUSM is due to limited number of room available, staffing and the service were only during office hour.

The target of this study is to see the obstetric outcomes between primiparity and multiparity on epidural analgesia. The obstetric outcomes will be assessed to see any difference in the progress of labour , the mode of delivery and the neonatal outcomes. Besides, the obstetric outcomes above will be compared between the non-epidural group who are on other types of analgesia provided in the labour room such as intramuscular opiods or inhalational entonox.

These information and knowledge about benefit and outcomes of epidural analgesia will give a better view to patient in choosing the best options of analgesia.

We hope from this study, the outcome measures will give benefit to the patient in term of knowledge and evidence conducted in our local set up and confidence about the successful outcome while on epidural analgesia.

LITTERATURE REVIEW

2 LITTERATURE REVIEW

Epidural analgesia has become accepted as a safe and effective pain relief during labour over decades. Though the popularity is increasing currently, controversies of the effect of epidural analgesia on progress of labour and outcomes mode of delivery is still the main concern of obstetrician.

Epidural analgesia has been reported to prolong first stage and second stage of labour. This has been shown in many studies as well as in several systemic review. Sharma et al. in 1997 in his RCT on Epidural analgesia versus patient controlled Meperidine in nulliparous women showed there is a significant prolong of first stage of labour in epidural group 260.3 ± 188 minutes compared to the other group which is 199 ± 171 minutes, p= 0.01. Similar finding were noted in his study performed in 2002 where he compared epidural analgesia with IV Meperidine. In that study he found that the first stage of labour was 302 ± 189 minutes for Epidural group 261 ±188 minutes for the IV Meperidine group (Sharma et al., 2002). Thorp et al. (1993), showed there was an increased of first stage of labour in epidural group by average of 31 % compared to non-epidural group. Ramin et al. (1995) in his study also demonstrated the same finding on an increased first stage of labour in epidural group. They also reported on associated with an increased used of oxytocin augmentation due to slower rate of cervical dilatation in the labour epidural group.

A prospective randomized study in University Malaya in year 2000, involving 55 patients in the epidural group and 68 in the control pethidine--inhalational entonox group (controlled group) showed similar finding where total duration of labour and the duration of the second stage was prolonged in the epidural group ($p < 0.01$) and increased risk of fetal malposition, $p<0.02$. (Sivanesaratnam et al, 2000).

In contrast, studies done by Bofill et al.(1997) Howell et al. (2001) and Phillips et al. (1983) found no increased in duration of first stage of labour with epidural analgesia. Howell et al. (2001) in his RCT on epidural analgesia versus no epidural analgesia in primigravida showed the epidural group had mean first stage of labour of 388.4 ± 189.8 versus 349.5 ± 206 minutes where the mean different of first stage of labour was only 39 minutes, $p= 0.06$. Dickinson et al., 2002 in his study on intrapartum analgesia and delivery outcomes in nulliparous women showed no significance different in first stage of labour between groups whether it was spontaneous or induced labour which were 8.9 (IQ 6, 12.5) versus 9.5 (IQ 7,12.7) hour with $p=0.069$.

Similarly in second stage of labour , there was a significant increased in duration of second stage of labour . Thorp et al., 1996 showed women with epidural analgesia had a second stage as twice as longer time of non-epidural group and was associated with greater rate fetal malposition. Saunders et al. (1989) intervened the second stage of labour in epidural group by giving oxytocin augmentation at full dilatation of cervix showed there is reduction in mean second stage duration . Sharma et al. (1997) in his study showed no significant difference in second stage of labour in epidural group when compared to continuous Meperidine in nulliparous women with mean duration of 46.6 ± 68) versus 36.4 ± 87 minutes.

Prolonged second stage of labour was also noted when they compared epidural analgesia with IV meperidine among nulliparous women which were 56 ± 42 versus 45 ± 42 minutes (Sharma et al., 2002) . In other study done by Howell et al. in 2001 showed that the duration of second stage of labour in epidural group was longer than non-epidural group with 80.7 ± 60.4 minutes versus 62 ± 68.9 minutes.

Numerous studies were performed to evaluate the association between epidural analgesia with the mode of delivery either by caesarean section or instrumemtal deliveries. Epidural have been proven to have capacity to prolong the second stage of labour this resulting in higher rate of forcep delivery. If a high concentrations dose of epidural drugs given closed to second stage it may increase the likelihood of midcavity forcep. There were significantly more obstetric interventions (ID) in the epidural group , $p < 0.01$(Sivanesaratnam et al., 2000). Epidural analgesia increased by causing the patient to lost the sensation of bearing down (loss of Furgeson's reflex) during that stage. This fact has been supported by a RCT where the incidence of instrumental delivery was higher in the epidural group, 30% versus 19% (Howell et al, 2001). The other supported studies done by Sharma et al., (1997 and 2002). They showed that more nulliparous women underwent forceps deliveries for the epidural group compared to the IV Meperidine group (9% versus 3% in 1997 and 12% versus 3% in 2002) . Dickinson et al., 2002 also reported a slight increased of instrumental delivery rate in the epidural group of 34.3 % versus 29.7 % in continueouse midwifery support (CMS) group.

Recently, several practices on epidural analgesia have developed which endeavour to preserve pelvic muscle strength during second stage and shorter the duration of second stage. They include:

- the used of low-concentration solutions of local anaesthetic agents
- the used of local anaesthetic solution-opioid combination solutions, and
- restricting the administration of epidural analgesia close to second stage.

In caesarean section delivery, epidural analgesia does not showed increased risks of caesarean section. Sharma et al in 2002 no difference in caesarean rate between epidural and IV Meperidine groups, 16 % versus 20 % respectively. Halpern et al also gave similar finding where the epidural analgesia did not associated with an increased rate of caesarean section, 8.2% in epidural group and 5.6 % in non-epidural group. Similar study done by Dickinson et al. in 2002 showed no difference in the incidence of operative delivery rate (caesarean section) between epidural and CMS which was 17.2 % versus 14.2 % respectively.

This finding contradicted the finding suggested by Thorp et al in 1993, who reported the caesarean delivery rate was increased to 25 % when epidural analgesia was used compared to 2.2 % among the non-epidural group. The caesarean indication for dystocia in epidural group is 16.7 % and in non-epidural group is 2.2 %.

In the association of oxytocin augmentation with epidural analgesia, Sharma et al. in 2002 in RCT comparing epidural group and IV Meperidine group showed the use of oxytocin augmentation was high in epidural group which were 45 % versus 34%. In RCT done by Lougnan et al in year 2000 showed there was no significant difference in the used of oxytocin augmentation among epidural and Pethidine group, 61% versus 57%. Dickinsen et al. (2002) in a prospective study RCT in nulliparous women showed there was a slight an increased in requirement of oxytocin used in epidural group which was 46.2 % versus 39.3 % . Starting an oxytocin infusion at the beginning of second stage in epidural patients without prior oxytocin stimulation reduces the number non rotational forcep deliveries but did not reduce the rotational forcep deliveries associated with malposition. (Saunder et al, 1989). This indicate that epidural analgesia increased risk of malposition at second stage which lead to prolonged second stage.

Looking at the fetal outcomes (Apgar scores (AS) and Special Care Nursery admissions), epidural analgesia gives better AS >7 at 1 and 5 minutes on epidural analgesia improved fetomaternal blood circulation. This has been shown in the study done by Sharma et al., 2002 where less baby from epidural group has AS < 7 at 1 minutes which was 4% and 14% in IV Meperidine group. Its also been shown that epidural group's neonates less required naloxone and less NICU admission (Dickinsons et al.,2002; Ramin et al.,1995 ; Halpern et al.,2004) .

Other complication following epidural is back pain which can occur immediately after administration, intrapartum, 24-48 hours and or up to 3 months postpartum. However, a randomized controlled trial done by CJ Howell et al. (2001) shown that there was no significant different or direct association between epidural and non-epidural group in term of backache even middle backache (22% versus 20%) or low back ache (35% versus 35%).

Apart from back pain, headache also appeared as one of the complaint immediate after the epidural. It is a common symptoms particularly during post partum periods. Benhamou et al. (1995) found postpartum headache was present in 12.1% of those who had epidural without epidural puncture and 15.2% in those who are not received epidural. Therefore careful evaluation of headache was crucial to differentiate between dural puncture and common headache. The incidence of dural puncture is small, ranging from 0.2% – 4%.

Patients in the epidural group were consistently happier with their method of pain relief $p < 0.01$(Sivanesaratnam et al., 2000). Women in this group had better pain scores. The clear disadvantages of epidurals over systemic opiods probably outweighed the small advantage of the need of antenatal vagina delivery which is small in numbers.