

The frequency of death among hospitalized neonates with hyaline membrane disease (HMD) in AL-DIWANAH maternity and children teaching hospital from (2005-2007).

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الخلاصة

تردد الوفيات بين المرضى الداخليين الى مستشفى النسائية والاطفال التعليمي والمصابين بمرض الغشاء المشفى. تقييم تردد الوفيات بين الاطفال الخدج وحديثي الولادة المصابين بمرض الغشاء المشفى الداخليين في مستشفى النسائية والاطفال في الديوانية مع دراسة العوامل التي تؤدي الى نتائج سلبية دراسة استرجاعية لكل الاطفال المصابين بمرض الغشاء المشفى والداخليين في وحدة الخدج وحديثي الولادة واللذين توفوا خلال مدة البحث ثلاث سنوات وتم تصنيفهم اعتمادا على عوامل مختلفة (الجنس, الوزن عند الولادة, اسابيع الحمل, ايام الرقود في المستشفى سبب الوفاة) كان عدد الولادات الحية خلال مدة البحث 25463 وكان عدد المرضى المصابين بالمرض 356 وكان عدد المتوفين 112 (30%), وكانت نسبة الذكور للاناث (1: 1/2), وكان لسبب الرئيسي للوفاة هو توقف التنفس 87%, وتم مقارنة العوامل المؤدية للوفاة مع دراسات اخرى. امكانية التشخيص قبل الولادة غير متوفرة حاليا, واما التشخيص بعد الولادة فيعتمد على العلامات السريرية والشعاعية, ونسبة الوفيات ممكن تقليصها بتحسين مستوى الرعاية قبل, اثناء, وبعد الولادة وتجهيز وحدات الخدج بأجهزة التنفس الاصطناعي ورفع مستوى كفاءة منتسبيها من اطباء وكادر تمريضي.

Abstract

Assessment the frequency of death among hospitalized neonates with HMD in AL-DIWANAH, maternity and children teaching hospital, and to analyze risk factors associated with poor outcome.

Patients and methods: all the neonates with HMD who were admitted to neonatal intensive care unit (NICU) and expired, during a period of three years (2005 -2007), the patients were divided according to different parameters (sex, B,W, gestational age, mode of delivery, days of death, cause of death,) A total live births of 25463, and a total of 356 case of HMD were admitted during the period of the study, and 112 neonate were died with a frequency of 30%, with sex ratio of male to female (1.4:1) respectively, and most of death was due to apnea in 87%, so the causes of death and risk factors for death were presented and compared with results of other studies in other parts of the world.

Major risk factor associated with HMD in the city were apnea, prenatal diagnosis facilities are not available, but post natal diagnosis depend mainly on clinical picture as no lab- test available in regard to L/S ratio by chromatography or shake test for amniotic fluid to assess

maturity can be performed, mortality can be reduced by improving the ante-natal, obstetric, post-natal care levels.

Introduction

HMD is the most common respiratory disorder in preterm infants (1). Over the last decade, because of improvements in neonatal care and increased use of antenatal steroids and surfactant replacement therapy, However respiratory morbidity, primarily broncho-pulmonary dysplasia, remains unacceptably high (2). To obtain best results, a multidisciplinary approach is crucial (3). Neonatal RDS occurs in infants whose lungs have not yet fully developed. The disease is mainly caused by a lack of a slippery, protective substance called surfactant, which helps the lungs inflate with air and keeps the air sacs from collapsing. This substance normally appears in mature lungs. It can also be the result of genetic problems with lung development (4). The earlier a baby is born, the less developed the lungs are and the higher the chance of neonatal RDS. Most cases are seen in babies born before 28 weeks. It is very uncommon in infants born full-term (at 40 weeks) (5). Synthesis of surfactant depend in part on normal PH, temperature, perfusion . so asphyxia, hypoxemia and pulmonary ischemia particularly with hypovolemia , hypotension and cold stress may suppress surfactant synthesis (6). RDS affects about 1% of newborn infants and is the leading cause of death in preterm infants (7). The risk of neonatal RDS may be decreased if the pregnant mother has chronic, pregnancy-related high blood pressure or prolonged rupture of membranes, because the stress of these situations cause the infant's lungs to mature sooner (8). Criteria for HMD :

- 1- Acute in onset

- 2-Oxygenation: A partial pressure of arterial oxygen to fractional inspired oxygen concentration ratio < 200 mm per Hg

- 3-Bilateral pulmonary infiltrates on chest radiograph.

- 4-Pulmonary artery wedge pressure < 18 mm per Hg or no clinical evidence of left atrial hypertension (9).

High-risk and premature infants require prompt attention by a neonatal resuscitation team. Despite greatly improved HMD treatment in recent years, many controversies still exist. Delivering artificial surfactant directly to the infant's lungs can be enormously important, but how much should be given and who should receive it and when is still under investigation. Infants will be given warm, moist oxygen. This is critically important, but needs to be given carefully to reduce the side effects associated with too much oxygen (10). There are a number of different types of breathing machines available. However, the devices

can damage fragile lung tissues, and breathing machines should be avoided or limited when possible(11) treatment called continuous positive airway pressure (CPAP) that delivers slightly pressurized air through the nose can help keep the airways open and may prevent the need for a breathing machine for many babies. Even with CPAP, oxygen and pressure will be reduced as soon as possible to prevent side effects due to excessive oxygen or pressure (12), a variety of other treatments may be used, including:

- 1 Extracorporeal membrane oxygenation (ECMO) to directly put oxygen in the blood if a breathing machine can't be used
- 2 Inhaled nitric oxide to improve oxygen levels (13).

Infants with HMD also need careful fluid management and close attention to other situations, such as infections. (14).

Patients & methods

three hundred fifty six cases of HMD were studied retrospectively within a period of 3 years from (jan-2005 ---- dec -2007).Those patients admitted in AL- DIWANIAH maternity and children teaching hospital (neonatal intensive care unit –NICU) this unit compose of 16 incubators with only central oxygen supply available but no other facilities like (apnea alarm, surfactant therapy , mechanical ventilators ,CPAP devices, blood gas analyzer , serum electrolyte assessment, blood culture).The staff of this unit in regard to doctors (residents & specialists) have no specific training in the field of neonatology except one specialist who had the chance for neonatology training outside the country.

All the nursing staff have poor neonatal training(inside or outside Iraq)

The patients involved in the study have different gestational age , sex ,body weight, mode of delivery and maternal history. So the patients classified according to these parameters into different groups.

All the information were taken from the case sheet in the statistical department of the medical records in the hospital.

Results

The total number of live births deliveries during 3 years from (jan-2005 ---- dec -2007), were (25463) ,during these three years (356) case of HMD were admitted to the NICU, so the mean frequency of HMD is 1.3% of total live births.

we demonstrate the total number of affected babies in each year(95,123,128) (2005,2006,2007) respectively, with male to female

ratio(1.2:1) as shown in table. 1

Table 1: sex distribution of patients with HMD

Year	female	male	No. of pts.	male / female
2005	45	50	95	1.1 :1
2006	52	71	123	1.3 :1
2007	67	71	138	1.1 :1
total	164	192	356	1.2:1

Regarding body weight (B.W),the patients were classified into different groups, the most common group was neonates whose B.W(1500-1999gm) 45.5%, and the least group B.W (<1000gm) 6.7%,as shown in table.2

note: (25%) of our patients were V.L.B.W.< 1500 gm) gestational age.

Table 2: distribution of patients according to their body weight

B.W in gm	No of pts.	%
< 1000gm	24	6.7%
1000 -1499gm	70	19%
1500- 1999gm	162	45.5%
2000-2499gm	44	12.3%
> 2500gm	56	15.7%
total	356	100%

regarding the gestational age the study revealed that the most common group were neonates whose age (33-37wk) 47%, and the 2nd common group were neonates whose age (28-32wk) 36%,as shown in table 3.

Table 3: distribution of patients according to their gestational age in weeks

Gestational age/week	No. of pts.	%
< 28wk	19	5%
28 -32 wk	123	36%
33 -37wk	171	47%
>37 wk	43	12%
total	356	100%

According to mode of delivery, 70% (248 patient) were products of normal vaginal delivery(N.V.D), while the rest 30% (108 patient) were product of C/S. Then regarding the frequency of multiple pregnancy

we found that the total incidence of multiple pregnancy was 27% (97 pregnancy) , and 24% (84 pregnancy) of these were twins , while the other 3% (13 pregnancy) were triplet .The total number of dead patients were 112 (30%), with apnea as a common cause of death in 86.5%(96 patient),and the other causes forming the rest, as shown in table. 4

Table 4:Causes of death and it's percentage

No. of pts.	No. of dead pts.	%
apnea	96	86.5%
*IVH	5	4.5%
**NEC	3	3%
pneumothorax	2	2%
Interstitialemphysema	3	3%
Others	3	3%
total	112	30%

*IVH=interventricular hemorrhage

**NEC=necrotizing enterocolitis

Concerning the sex of dead patients we found that 56% (63 patient) were male and the rest 44% (49 patient) female, with male to female ratio of 1.4:1

regarding body weight(B.W), of dead patients, the study revealed that the frequency was 100% (24 patient) in those B.W (< 1000gm), and it 0% in those B.W (> 2500gm). as shown in table. 5

Table 5: relationship between body weight and the frequency of death.

B.W	Total no. of pts.	No. of dead Pts.	%	P-value
< 1000gm	24	24	100%	P<0.01
1000-1499gm	70	42	40%	
1500-1999gm	162	44	27%	
2000-2499gm	44	2	4.5%	
> 2500gm	56	-----	0%	
total	356	112	30%	

p- highly significant

60% (66 patient) of death occur in V.L.B.W. (B.W<1500gm).

Regarding the gestational age, We found that death was high in the patients whose gestational age (< 28 wk), 100% (19 patient), and death was low in those with gestational age (> 37 wk)3%(3 patients), as shown in table. 6

Table 6:relationship between the gestational age and the frequency of death.

Gestational age	Total no. of pts.	No. of dead pts.	%	p-value
<28wk	19	19	100%	P<0.05
28-32wk	123	63	45.5%	
33-37wk	171	27	24%	
>37wk	43	3	3%	
total	356	112	30%	

p- not significant

Regarding the mode of delivery, We found that 63% (72 patient) of death were products of N.V.D, while the other 37% (40 patient) products of C.S. as shown in table. 7

Table7:he relationship between the mode of delivery and the frequency of death

Mode of delivery	Total No. of pts.	No. of dead pts.	%	P value
N.V.D	248	72	248	P<0.05
C/S	108	40	108	
total	356	112	356	

Regarding multiple pregnancy, we found that 50% (56 patient) of death were results of multiple pregnancy , 40% (45 patient) were twins, and 10% (11 patients) were triplets.

Regarding the day of admission to NICU, We found most of death occur at the 2nd , 3rd day 66%(74 patient), as shown in table. 8

Table8:relationship between the day of admission and frequency of death.

Day of admission	No. of dead pts.	%
1	4	3.5%
2	31	27.7%
3	43	38.3%
4	25	22.2%
5	5	4.5%
6	3	2.5%
7-30day	1	0.8%
total	112	100%

Discussion

Total number of live births was 25463 within three years, only 356 cases of HMD noticed with frequency(1.3%),which more than studies (0.95%) as published in (4).which may be related to poor prenatal care and facilities in our hospitals The frequency of death in HMD in this study was 30% ,which is higher than other studies which was ranging between 24%, by Jobe AH, (19) and 10% by Behrman,Kliegman,Jenson (14). While it was similar to range of 30-40%. As in Klein JM et al. (22).the explanation to that may be due to poor ante-natal perinatal care facilities.Frequency of death was (100%) in patients whose B.W (1000gm),which is higher than study done in UAE by *A Dawodu,E, varady* (1) which was 83.3 % ,while it (40%) in patients whose B.W (1000-1499gm) which is higher than reported by Hall SB, 12.2% (16) But it was (27%) in patients whose B.W (1500-1999gm) which also higher than (1) as it was equal to 9.5%.but it was similar to what reported by (1,20) concerning patients whose B.W (≥ 2500gm), all these high figures are related to poor prenatal care and facilities as documented by(1,18) Most of death occurs between (2- 4)days of admission to NICU, Which is similar to that reported in (10,14). And male death was 56%, which was higher than other study done in UAE 36% (1, 23).which may be due to unavailability of surfactant therapy in our NICU. Mode of delivery was C/S in 37% which was higher than 26% by (26), that reflect the over use of C/S as a mode of delivery due to high economic income in our society.

Note: lack of significant information about the mother's clinical state so it difficult to analyze the prenatal risk factors in details.

Conclusion

HMD. Occurs in frequency of 1.3% of total live births and associated with mortality rate of 30%.post natal diagnosis depend mainly on clinical picture, and it is a disease of pre-term but it can affect full-term neonate in the presence of risk factors. the mortality and morbidity can be reduced by improving the ante-natal, obstetric, post-natal care levels.

Recommendation

1-there is an urgent need for improving the facilities of our NICU, in order to get better outcome.

2-improving the standards of our nursing staff and the responsible doctors.

3-willing specialists to work in the NICU is important step in improving the outcome.

4-notifying our health administration to provide the NICU by the following (CPAP,parenteral nutrition, blood gases analyzer, surfactant therapy, mechanical ventilator)

5- there is a need to open a new subspecialty(neonatology by the IRAQI COUNCIL FOR MEDICAL SPECIALIZATION, or providing scholarship for neonatology training.

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