

수액 제한된 부당 및 적정 저출생체중아에서 생후 체중변화

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Postnatal Body Weight Changes in Preterm SGA and Preterm AGA Infants on Fluid Restriction Therapy

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Objective : To determine the differences in water balance between preterm small for gestational age (SGA) and appropriate for gestational age (AGA) infants, we compared the difference in initial physiologic weight loss during the first five days of life and studied associated factors influencing the initial physiologic weight loss in preterm SGA and AGA infants.

Methods : We retrospectively analyzed water and electrolyte balance in 51 preterm low birth weight infants of whom 20 were preterm SGA infants (gestational age, 30.4 ± 1.6 weeks ; birth weight, 970 ± 180 g) and 31 preterm AGA infants (30 ± 1.7 weeks ; 1437 ± 276 g) matched by gestation.

Results : The percent weight loss was significantly lower in SGA than in AGA infants ($p=0.01$). The percent weight loss on the fifth day of life were $12.1 \pm 5.3\%$ in SGA and $15.8 \pm 4.3\%$ in AGA infants, respectively ($p<0.01$). SGA infants had significantly lower urine output on the second and third day of life compared to AGA infants. Diuresis started on the second day of life in AGA infants and on the fifth day of life in SGA infants.

Conclusion : The initial physiologic weight loss in SGA infants occurred in a smaller degree compared with AGA infants. This was associated with lower urine volume and the delay in onset of diuresis in SGA infants. These differences in water balance in SGA and AGA infants should be considered in the management of preterm low birth weight infants on mechanical ventilation.

Key words : Preterm, SGA infants, AGA infants, Initial physiologic weight loss, Diuresis.

가
가 (extracellular fluid, ECF)
가
1980 가
: 2003 2 8
: 2003 3 11
: , 120 - 752 134
: (02)361 - 5510 · : (02) 393 - 9118
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(fractional excretion of sodium) 가
가
(appropriate for gestational age, very
low birth weight infant)

(small for gestational age, SGA)

(
,
)
가
가
가 (appropriate for gestational
age, AGA)

1000g SGA(35±2 , 1550±
195g) 가
AGA(31±2 , 1570±165g)

1000g
AGA(25.9±
1.7 ; 787.3±148.5g) SGA(28.9±2.6 ; 762.2±
156.3g) 가 AGA

21.6%, SGA 16.7% ,
가

AGA
SGA
3~4 가

AGA
SGA

1 , AGA
가 SGA

연구대상 및 방법

1. 대 상

1989 1 1996 12 7

5 51
(SGA , n=20) (AGA ,
n=31) , SGA
2
, AGA 25~75

AGA SGA

2. 방 법

SGA AGA

50ml/kg/day
(+) 80%
{(intake - output) -
()}ml/kg/day

3%가 5 15%

가 furosemide 1mg/kg/
dose

dopamine 3 µg/kg/min

1.008~1.025,

135~145mEq/L

(CAS, Seoul)
(OHAUS, Florham park, New
Jersey, USA)
(% coefficient variation) 0.19%

가 36.5 가
5
36.5 가
5
ml/kg/day)
SAS(Version 6.04) repeated measures ANOVA Student t - test, Fisher's exact test

5 98 ± 32.9ml/kg/day가 . SGA
1 54.2 ± 12.3ml/kg/day, 5 112.1 ± 46.9ml/kg/day
가 (Table 2).

3. 생후 첫 5일간의 평균 체중감소율

5 SGA AGA
(p=0.01), 3 가
5 SGA 12.1 ±

Table 2. Fluid intake during the first 5 days of life

Day	SGA(n=20)	AGA(n=31)
1	54.2 ± 12.3	51.5 ± 10.1
2	66.4 ± 13.4	59.9 ± 10.2
3	83.7 ± 24.3	79.1 ± 21.3
4	104.7 ± 34.3	90.5 ± 21.4
5	112.1 ± 46.9	98.0 ± 32.9

Values are mean ± SD(ml/kg/day)
p=N.S.

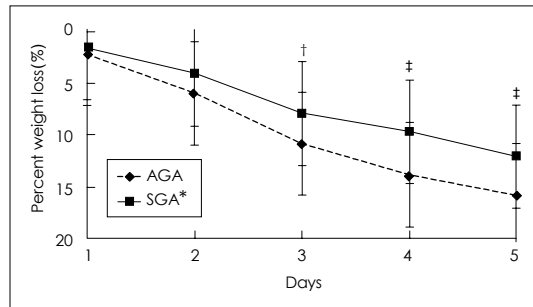


Fig. 1. Percent weight loss compared to birth weight during the first 5 days of life.

* : p=0.01, by repeated measures ANOVA,
† : p=0.01, by Student t-test,
‡ : p<0.01, by Student t-test.

결 과

1. 임상적 특성

51
(SGA) 20 , (AGA) 31
. SGA 30.4 ± 1.6 ,
970 ± 180g AGA
30 ± 1.7 1437 ± 276g SGA
(p<0.01). Apgar ,
가 (Table 1).

2. 생후 첫 5일간의 수액 투여량

AGA
1 51.5 ± 10.1ml/kg/day

Table 1. Clinical characteristics

	SGA(n=20)	AGA(n=31)
Gestational age(weeks)	30.4 ± 1.6	30.0 ± 1.7
Birth weight(g)	970 ± 180*	1437 ± 276
Apgar score		
1min	2.8 ± 1.9	2.7 ± 1.9
5min	4.4 ± 1.9	5.1 ± 1.6
M : F	10 : 10	20 : 12
Cesarean section	15(75%)	19(59%)
Patent ductus arteriosus	13(65%)	23(72%)
Bronchopulmonary dysplasia	6(30%)	9(29%)
Surfactant therapy	10(50%)	16(50%)

* : p<0.01

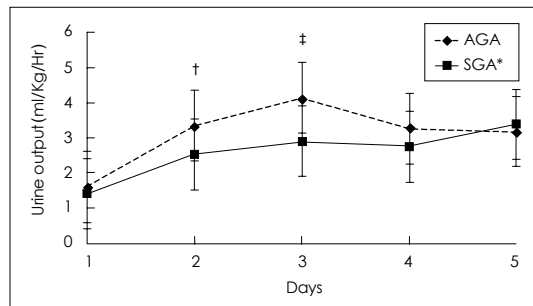


Fig. 2. Urine output during the first 5 days of life.

* : p<0.05, by repeated measures ANOVA,
† : p<0.01, by Student t-test,
‡ : p<0.001, by Student t-test.

Table 3. Serum sodium and urine specific gravity during the first 5 days of life

	SGA(n=20)	AGA(n=31)
Serum Na(mEq/L)		
Day 1	139 ± 3.4	136 ± 3.3
2	139 ± 3.8	137 ± 3.5
3	142 ± 7.0	139 ± 4.7
4	140 ± 5.8	137 ± 3.9
5	138 ± 5.3	137 ± 3.9
Urine S.G.		
Day 1	1.010 ± 1.004	1.012 ± 0.004
2	1.013 ± 1.010	1.010 ± 1.005
3	1.012 ± 1.008	1.007 ± 1.004
4	1.012 ± 1.005	1.010 ± 1.004
5	1.010 ± 1.005	1.013 ± 1.005

p=N.S.

Table 4. Medications and transfusions during the first 5 days of life

	SGA(n=20)	AGA(n=31)
Furosemide(doses)	2.6	2.4
Dopamine(μ g/kg/min)	3.0	3.2
Mefenamic acid	13(65%)	23(72%)
Packed RBC	16(80%)	19(61%)
Fresh frozen plasma	7(35%)	4(13%)

p=N.S.

5.3%, AGA 15.8 ± 4.3% (p<0.01, Fig. 1).

4. 생후 첫 5일간의 소변량 및 이뇨시작 시기

5 SGA (p<0.05).
 2 (p<0.01) 3 (p<0.001) SGA (Fig. 2).
 AGA 2 3.3 ± 1ml/kg/hr 가 SGA 5 3.4 ± 1.7ml/kg/hr 가 .

5. 생후 첫 5일간의 혈청 나트륨 농도 및 뇨 비중

(136~142 mEq/L) SGA 4 가 3~5 15% 10
 AGA 2 3 5 ,

(Table 3).

6. 생후 첫 5일간 이뇨제, Dopamine 및 혈액제제 투여

5 furosemide , dopamine

가 . Mefenamic acid ,

가 (Table 4).

고 찰

5 1
 6 2가 (total body water) 3
 94% 가
 78%, 12 70% 가
 가 1
 가
 7 가
 가
 가 가
 가 8
 9
 10

SGA 4

11

osmolality

가 , SGA SGA AGA

AGA 가 SGA

AGA 가

가

가

가

가

SGA AGA (prediuretic phase) 2~3 가

가 Cassady Milstead¹² SGA (diuretic phase) 4~5

AGA SGA (post

AGA Wagen¹³ sucrose diuretic phase) 25 가 96

deuterium oxide dilution 가

SGA (35.7 ± 3.1 , 1550 ± 460g) (free water loss)

가

가

Wagen¹³ SGA

AGA 1

Bauer³ stable water isotope deuterium 2 3.3ml/kg/day

oxide dilution method SGA 5 3.38ml/kg/day

AGA(31 ± 2 , 1570 ± 165g)

SGA(35 ± 2 , 1550 ± 195g) 가 가

1

AGA 1 6 5

5% , SGA 6 1 가

1

가 , SGA

AGA SGA

SGA AGA creatinine BUN, SGA

15

가

가

가

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= 국문 초록 =

연구목적 : (SGA) (AGA) 가

방 법 : 1989 1 1996 12 7 51 (SGA , n=20) (AGA , n=31) 5 (>3ml/kg/day)

결 과 : 1) SGA 30.4±1.6 (mean±SD), 970±180g AGA 30±1.7 , 1437±276g SGA (p<0.01).

2) 5 SGA AGA (p=0.01), 5 SGA 12.1±5.3%, AGA 15.8±4.3% SGA (p<0.01).

3) 5 SGA (p<0.05), 2 3 SGA가 AGA (p<0.01). SGA 5 , AGA 2

결 론 : SGA AGA 5 SGA AGA 가

중심 단어 : , , , , .