

Steatocrit Value in New-Born Babies

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ABSTRACT A prospective study on steatocrit value in full-term or preterm newborn babies of ≥ 2 days of age in Dr. Pirngadi Hospital, Medan is reported. This study was conducted from December 7, 1992, to February 7, 1993; there were 72 newborn babies (37 males and 35 females). The body weight was > 2500 g in 60 babies and ≤ 2500 g in 12 babies. The median steatocrit value in babies with body weight of > 2500 g was 9%, and it was 32% in babies less than 2500 g of body weight. The proportion of babies with $> 25\%$ steatocrit value was larger in babies less than 2500 g than that in 2500 g by the diet patterns of breast milk, breast milk and milk formula, milk formula. The proportion of babies with $< 25\%$ steatocrit value was higher in babies with body weight of < 2500 g than that in babies > 2500 g for those who had either breast milk, breast milk and milk formula or milk formula. There was significant difference ($p < 0,05$) in the steatocrit levels between babies with the body weight of > 2500 g and those who had body weight of ≤ 2500 g. [*Paediatr Indones* 1995;35:190-193]

Introduction

Increased fat content in stool may be associated with digestive and absorptive disturbances of fat, or with fat intake that higher than the capacity of fat digestion and absorption. The processes of absorption and digestion are complex mechanisms, which include lipolysis, rees-

terification, micelles formation, chylomicron formation, and fat transportation into blood vessels. Therefore, the presence of fat in stool may be due to disturbed process disorders of bile, pancreas, mucous, and the abnormalities of fat transportation and lymph nodes.¹

In Indonesia, fat malabsorption is associated with post-gastroenteritis malabsorption, protein energy malnutrition, and low birth weight.² In low birth weight babies, fat in stool is frequently seen due to the ingestion of fat in excess to the capacity of absorption and digestion. The

presence of fat malabsorption may be detected by van de Kamer's analysis or lipidol absorption test, but these two procedures are impractical and time consuming. Therefore a quick, simple, and reliable method must be sought to detect the fat in stool.³⁻⁵

Phua Pradit developed a simple examination using a reliable and quick method to detect fat in stool by centrifugation technique using a capillary pipe. This method is used to detect fecal fat in many cases such as in patients with cystic fibrosis or gastroenteritis.^{6,7} Fat malabsorption is a serious problem in newborn babies, especially in low birth weight or small for gestational age babies, in whom the weight gain is slow in early life which may be associated with the increase in fat output in stool.⁵ This study aims to determine the steatocrit values, especially in newborn babies.

Methods

This study was conducted prospectively from December 7, 1992 to February 7, 1993 in apparently healthy newborn babies cared at the perinatal ward Dr. Pirmgadi Hospital, Medan.

Steatocrit analysis

Stool specimens were obtained from healthy neonates aged 2 days or more healthy without meconium in their stool. Steatocrit analysis were done using 0.5 g of stool, followed by the addition of 2.5 ml of water and processed to make it homogenous. The stool was then put into a haematocrit capillary pipe and one end of

the pipe was sealed with wax. The haematocrit pipe was then centrifuged with 10,000 rpm for 15 minutes, and it was placed vertically and measured using a loupe. The layers in the pipe were measured with a calibrator with an error of 0.05 mm. There are three layers; the upper layer is fat (F), the middle layer is clear material, and the lower layer is solid material (S).

Steatocrit value was expressed in percent, and was calculated by using the following formula:

$$\text{steatocrit (\%)} = \frac{F}{(F + S)} \times 100 \%$$

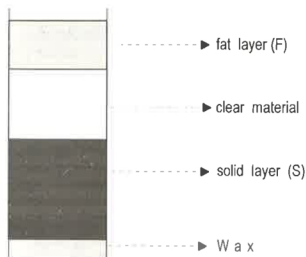


Figure 1. Layer within the naematocrit pipe.

Results

From December 7, 1992. to February 7, 1993, 72 babies fulfilled the study criteria. Their body weight ranged from 1900 g to 4550 g. Sixty of them had body weight > 2500 g (30 males and 30 females) and 12 babies with ≤ 2500 g (6 males and 6 females). See Table 1.

Table 1. Distribution of weight and sex according to age

Age (days)	< 2500 g		> 2500 g		Total
	Boys	Girls	Boys	Girls	
2	3	2	22	22	49
3	2	3	8	6	19
4	1	-	-	-	1
5	-	1	1	1	3
	6	6	31	29	72

The diet patterns in these babies were: breast milk only in 30 babies (15 males and 15 females), breast milk and milk formula in 34 babies (17 males and 17 females), and milk formula alone in 8 babies (5 males and 3 females) (Table 2).

Table 2. Diet pattern of babies

Diet pattern*	Boys	Girls	Total
BM	15	15	30
BM + MF	17	17	34
MF	5	3	8
Total	37	35	72

* BM = breast milk, MF = milk formula.

Of the 60 babies with the body weight of > 2500 g, the median level of steatocrit was 9% (Table 3). In 12 babies with body weight of \leq 2500 g, the median level of steatocrit was 42%; with breast milk in 5,5%; breast milk and milk formula in 25,45%; milk formula alone in 45,4% (Table 4). There was significant difference ($p < 0.05$) in the steatocrit value between babies with the body weight of > 2500 g

and those who had body weight of \leq 2500 g (Mann-Whitney U test, Table 5).

Table 3. Steatocrit value in babies of > 2500 g according to the diet patterns

Steatocrit value	BM	BM+MF	MF	Total
0 - 5	9	8	-	17
6 - 10	7	14	1	22
11 - 15	5	-	-	5
16 - 20	1	4	-	5
21 - 25	1	3	-	4
26 - 30	-	-	-	-
31 - 35	1	-	1	2
36 - 39	2	-	-	2
> 40	2	1	-	3
Total	28	30	2	60

*BM=breast milk, MF=milk formula

Table 4. Steatocrit value in babies of < 2500 g according to diet patterns

Steatocrit value	BM	BM + MF	MF	Total
0 - 5	1	1	-	2
6 - 10	-	-	1	1
11 - 15	1	-	-	1
16 - 20	-	-	1	1
21 - 25	-	-	-	-
26 - 30	-	1	1	2
31 - 35	-	1	-	1
36 - 39	-	1	-	1
> 40	-	-	3	3
Total	2	4	6	12

*BM=breast milk, MF=milk formula

Table 5. Comparison of median of steatocrit values between babies of > 2500 g and babies of ≤ 2500 g

Body Weight (g)	Median (%)	Variance
> 2500	9	226.81
≤ 2500	29.25	705.29

Mann-Whitney U test $p < 0.05$

Discussion

Our study on steatocrit values in limited number of subjects may be used as an initial effort to determine normal steatocrit values in newborn infants in Indonesia. Steatocrit has been investigated by many investigators in different populations. Colombo (1987)⁶ reported the significant correlation between steatocrit levels and fat excretion coefficient in 70 children with cystic fibrosis. Iacono also examined the steatocrit level in acute diarrheal cases associated with cow's milk protein intolerance.⁷

Our series indicated that steatocrit levels in newborn babies were variable. The median level of steatocrit levels was 32% in babies with body weight ≤ 2500 g. Steatocrit level of >25% in babies of ≤ 2500 g was in a higher compared with babies of > 2500 g, based on their feedings with either breast milk, breast milk plus milk formula, or milk formula alone. Significant ($p < 0,05$) difference in steatocrit

levels was found between babies with body weight of >2500 g and those of ≤2500 g.

The steatocrit analysis is necessary to be performed not only in newborn babies, but also in association with certain abnormalities such as fat malabsorption.

References

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