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DAILY DIETARY INTAKE OF CALCIUM AND STRONTIUM-90 BY THE INFANTS AGED UP TO ONE YEAR OLD

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The purpose of the paper was to study the dietary composition specific for infants below one year old. The study was conducted in pediatric departments in one of Chelyabinsk' policlinics. Feeding of the infants under the study was controlled for three days. The dietary composition was analyzed for 190 infants.

Weighting method accepted in pediatric studies was used to determine the amount of breast milk consumed by the infants; the amount of other foodstuff consumed was determined by using questioning of mothers.

All infants in the study were grouped into four sub-groups depending on the time when foodstuff other than breast milk was introduced into the diet:

2 weeks-3 months – 50 infants;
3-5 months – 48 infants;
5-8 months – 42 infants;
8-12 months – 50 infants.

Dietary composition for naturally feeding infants and the contribution of calcium and strontium-90 with each dietary component into the total diet is shown in Table 1.

Daily dietary intake of strontium-90 for indicated sub-groups of infants was evaluated using available data of foodstuff contamination by strontium-90, including breast milk,. These data were also used for evaluation of the calcium and strontium-90 contribution with each dietary component into the total diet of infants (shown in Table 1).

It is seen from Table 1, that breast milk is the main dietary component for infants during the first three months of life (660 g) and is the major source of calcium (92%) as well as of strontium-90 in the infant diet. Estimated daily intake of calcium was 180 mg.

At the age between 3 and 5 months additional dairy products like cow milk, artificial milk mixtures and 5% of semolina pap are included into the infant diet. However, the additional feeding constitutes only 14% of the total diet. Breast milk remains to be the main dietary component at these ages (86%) and the major source of calcium (63%). Strontium-90 is ingested with both cow milk and dairy products (58%) and breast milk (42%). Estimated daily intake of calcium at these ages was 275 mg.

At the age from 5 to 8 months the consumption of breast milk is reduced. The amount of breast milk consumed by 8-mo old infants is about one-half compared to previous age period (about 700 mg for 3–5-mo). At this age period other dairy products are introduced into infant diet, which become the main sources of calcium and strontium-90. About 65% of calcium and 70% of strontium-90 are consumed with dairy products. Estimated daily intake of calcium during this age period of life was 430 mg.

Therefore, dietary composition and the contribution of different components into total ingestion of calcium and strontium-90 change through the first year of life, although the ration remains "milky".

The comparison of daily intake of calcium by suckling infants and by preschool children showed that the intake by infants is nearly twice lower than by preschool children (i.e. 380 mg Ca/day during the first year).

Dietary strontium-90 intake by infants also occurs with dairy products, but the contribution of strontium-90 intake with breast milk and cow milk is different. During the first three months of life about 85% of strontium-90 is consumed with breast milk while by the end of

the first year of life (8-12 months) strontium-90 is ingested with cow milk and dairy products (70%). The contribution of bread and grain products becomes up to 20% during the age period from 5 to 12 months.

The comparison of daily dietary strontium-90 intake by infants and by other age groups (in strontium units, i.e. pCi ^{90}Sr per g Ca) shows that the concentration of strontium-90 per gram calcium in infant diet is 5 times lower than in adult diet and 3 times lower than in the diet of preschool children.

The dietary composition of artificial feeding of infants is considered here according to pediatric recommendations. At the age before 7 months, artificially fed infants mostly consume different dairy products and, therefore, the intake of strontium-90 and calcium occurs with these products. The dietary composition of artificially fed infants older 7 months will be similar to that for naturally fed infants.

Conclusions:

1. Dietary composition and the contribution of different components into the total ingestion of calcium and strontium-90 change through the first year of life.

2. Dairy products are the major sources of calcium and strontium-90.

3. Daily dietary intake of strontium-90 for infants aged up to one year old is 30 s.u. (30 pCi ^{90}Sr per g Ca) on average.

Table 1. Relative contribution (%) of calcium and strontium-90 with dietary products into the total diet of infants of different ages up to one year old

Components of the diet	2 weeks – 3 months			3 – 5 months			5 – 8 months			8 – 12 months		
	Weight, g	Contribution into the total diet, %		Weight, g	Contribution into the total diet, %		Weight, g	Contribution into the total diet, %		Weight, g	Contribution into the total diet, %	
		Ca	^{90}Sr		Ca	^{90}Sr		Ca	^{90}Sr		Ca	^{90}Sr
Breast milk	660	92	85	690	63	42	380	22	9	62	2.3	1
Cow milk and dairy products				95	36	58	256	67	60	445	74	73
Bread							28	1.1	19	34	1	16
Potato							25	0.6	3	29	0.5	3
Meat, eggs										50	2	5.8
Other	13	7.8	15	20	1		120	9.3	9	300	20.2	1.2
Total weight of the diet	673			805			810			920		