

The effect on serum Cu level of Zn administration in tube-fed patients

Risa Mizuta, N.D.^{#1}, Chikako Sakai, N.D.^{#1}, Kenji Yamakita, N.D.^{#1}, Syuji Kishimoto,^{#2}, Naho Fujii,^{#2}, Sumiko Aki, R.N.^{#3}, Seiji Ohata, M.D.^{#4}

^{#1}. Department of Nourishment management room of Tokushima National Hospital, National Hospital Organization, 1354 Shikiji, Kamojima, Yoshinogawa, Tokushima 776-8585 Japan

^{#2}. Department of Laboratory, Tokushima National Hospital, National Hospital Organization, 1354 Shikiji, Kamojima, Yoshinogawa, Tokushima 776-8585 Japan

^{#3}. Department of Nursing, Tokushima National Hospital, National Hospital Organization, 1354 Shikiji, Kamojima, Yoshinogawa, Tokushima 776-8585 Japan

^{#4}. Department of Surgery Tokushima National Hospital, National Hospital Organization, 1354 Shikiji, Kamojima, Yoshinogawa, Tokushima 776-8585 Japan

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Abstract

The supplying of Zn is effective in pressure sore treatment. However, when Zn is absorbed by the intestinal tract, the absorption of Zn competes with absorption of Cu. Therefore, absorption of Cu is inhibited, and the administration of Zn may be needed. Moreover, a Cu deficiency may be caused. We gave Promac® (a Zn-containing drug) to patients receiving tube feeding and the decubitus, and examined the effect. Five patients who were hospitalized at our hospital were given Promac, and the TP of the serum, Alb, Cu, a Zn level were measured. The serum Zn level and the serum Cu level were 61.2±11.78 (50-81) and 117.6±10.01 (104-127), respectively. The serum TP level was 6.6±0.56 (5.8-7.3). The serum Alb level was 2.8±0.32 (2.4-3.2). None of the patients presented with copper deficiency after Promac® administration.

Keywords: The effect, Cu, Zn, tube-fed patients

Introduction

Zinc is a nutrient which is necessary for synthesis of nucleic acid and protein, and for maintenance of taste and the immune function. Zinc acts on the metabolism of the skin and is able to promote wound restoration. When zinc deficiency disorders are found, zinc administration of 40 mg/day or more is recommended in NPUAP/EPUAP guidelines. There is no recommendation for the quantity of zinc which is effective for healing of wound. Copper absorption is in a relation of competing with zinc. Therefore, copper deficiency may be induced by a high

zinc intake. Therefore, it was examined whether our hospital treatment had an influence on the serum Cu level because decubitus and the tube-fed patients were given a zinc-containing preparation (Promac®)

Subjects and methods

Five tube-fed patients with decubitus that the subjects is hospitalized in our hospital. Sex, BMI, DESIGN-R are shown in Table 1. The serum TP of subjects, Alb, Cu, a Zn level and the Zn/Cu ratio taken in were examined.

Results

The target Zn/Cu taken in was calculated to be 34 - 45/1. When it was calculated from recommended quantity of Zn and Cu by the diet intake standard of 2010, Zn/Cu was 13/1. There was clearly more Zn intake by the patients than with a standard diet intake. The administration days of the professional Mac and TP of the serum, Alb, Zn, Cu, Zn/Cu taken in are shown in Table 1. As for the serum Zn level, four of the five patients showed a lower level than normal after administration of Promac®. The serum Cu level showed a normal value range.

Discussion

Zinc is absorbed by small intestine epithelium cells, and is released subsequently by the portal vein. Zinc which is not taken in is excreted in feces, urine and sweat. The copper absorption is carried out

in the stomach and superior part of the duodenum. The absorption factor is 30-50%. More than 90% of the absorbed dose excrete in choler. When the copper absorption part is influenced, copper deficiency occurs. According to the diet intake standard of 2010, the Zn/Cu ratio is 13/1. As for the recommended quantity for same-age men, Cu intake is 0.9 mg and Zn intake is 12 mg. It has been reported that a desirable Zn/Cu ratio is ten to one or more. The Zn/Cu ratio taken in was just 34 - 45/1 in this study. A fall of the serum Cu level was not seen. Cu deficiency following Zn administration has been reported in patients with a history of chylopoietic disease. The study patients did not have chylopoietic disease or gastrectomy.

Table 1

Patient	Age (y)	Gender	BMI	Serum concentration				administered Zn/Cu	Promac® administration
				TP(g/dl)	Alb(g/dl)	Zn(mg/dl)	Cu(mg/dl)		
A	82	M	18.6	7.3	2.6	81	110	40	20 days
B	68	M	17.9	6.4	3	61	123	16438	63 days
C	76	M	18.3	5.8	2.9	56	104	12420	35 days
D	64	F	14.7	6.6	3.2	58	127	16072	36 days
E	76	M	15	6.9	2.4	50	124	14246	31 days