

Severe Acute Metabolic Acidosis (Acute Beriberi): An Avoidable Complication of Total Parenteral Nutrition

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Abstract

Total parenteral nutrition is one of the most important recent advances in medicine. The delivery of total parenteral nutrition, however, can be associated with a broad spectrum of complications ranging from mechanical (catheter related) to metabolic. We have recently seen a previously unreported complication of total parenteral nutrition - three patients maintained on total parenteral nutrition, who did not receive vitamins and experienced the acute onset of life-threatening metabolic acidosis with pH values as low as 6.70. All responded promptly and completely to the administration of intravenous thiamine, and thus were probably examples of acute beriberi. Acute beriberi is a well-documented syndrome which usually occurs in nutritionally compromised individuals outside the hospital setting who lack thiamine in their diet. Without thiamine, glucose cannot enter the Krebs cycle in order to be completely oxidized for energy production and therefore, accumulates as lactic acid. This lactic acidosis is refractory to any treatment except thiamine and will result in cardiovascular collapse if the vitamin is not administered. (

点滴などからの非経口のビタミンB1を含まない総合栄養輸液をしたら、命を脅かす程のアシドーシス (pH 6.4) が起こったが、チアミン (ビタミンB1) を投与したら速やかに回復したというレポートです。総合栄養輸液の中に入っているグルコースが体内のチアミン (ビタミンB1) が消費され、Krebs (TCA) 回路に取り込みができずに、乳酸アシドーシスを起こしてしまった。すなわち、糖質が入るとビタミン類は余分に消費され、糖が減少してくると糖原性アミノ酸が有機酸に変換され Krebs (TCA)に入りますが、その時に必要なビタミンは精製された糖の時に使ってしまう、欠乏状態があるため基礎代謝は阻害され、低下します。

J Neurol Neurosurg Psychiatry 1992;55:826-829 doi:10.1136/jnnp.55.9.826

Haemorrhagic thiamine deficient encephalopathy following prolonged parenteral nutrition.

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Abstract

Neuropathological examination of three patients who were maintained on parenteral nutrition without substitution of thiamine demonstrated an acute haemorrhagic encephalopathy. The lesions differed substantially from the classic features of thiamine deficient encephalopathy regarding the histopathological alterations and the topographical distribution. The extreme rapidity of thiamine deprivation may have been responsible for the abrupt clinical onset of the disease and the intensity of the morphological alterations.

ビタミンB1を添加しない輸液をつづけていて死亡した3名の患者の脳組織を調べたら、ビタミンB1の極端な欠乏で起こるウエルニッケ・コルサコフ症などのビタミンB1欠乏性脳疾患と極めて類似した像を示していることから、純化した糖質はビタミンB1などのビタミン類を使い尽くしてしまうため、脳の代謝性変性疾患にまで進んでしまう。

October 1996, Volume 26, [Issue 10](#), pp 769-776

TPN-induced fulminant beriberi: A report on our experience and a review of the literature

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Abstract

Fulminant beriberi, once considered a rare disease, is now being encountered more frequently, yet little is known about its clinical features. This study was undertaken to determine the clinical features of total parenteral nutrition (TPN)-induced fulminant beriberi by reviewing the clinical data on 10 of our own patients who developed this complication, and 33 cases documented in the literature. TPN-induced fulminant beriberi became evident 4–40 days after the initiation of TPN, and was more likely to develop in patients with malignancies, ulcerative colitis, and short bowel syndrome, as well as in those receiving chemotherapy. Although the patients manifested various symptoms, very few developed the classical signs of beriberi or the constant findings seen in alcoholic patients. The severity of metabolic acidosis was extremely high and refractory to bicarbonate administration, but it responded quickly to intravenous (i.v.) thiamine. Thus, rapid i.v. administration of at least 100 mg of thiamine is imperative, and the patient must be transferred to the intensive care unit when TPN-induced fulminant beriberi develops.

経口的にも食事ができるため、精製された糖質を含んだ輸液が点滴されると、点滴開始してから4～40日後には急性の激しい脚気となり、それが少なくとも100mgのビタミンB1の静注で改善されたことが記されています。すなわち精製された糖を代謝するのに十分なビタミンB1がない癌を患っていたり、潰瘍性大腸炎、腸切除後の患者、抗がん剤投与を受けている方の場合は重症で様々な症状を呈する脚気になるが、典型的な脚気やアルコール依存症の脚気のような症状はほとんど無い。すなわち、急性の代謝疾患で慢性的な脱髄疾患を呈しない。さらには、ビタミン類を添加しない輸液で点滴を行っていた3名の患者が重症乳酸アシドーシスとなり、そのうちの2名が死亡したことを報告しています。

ビタミンB1の欠乏の論文をおもに集めて、ご報告しましたが、精製した糖質を摂ることに対して、脚気などが最も有名で、研究が良くなされているからです。