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Prognosis in 41 severely malnourished anorexia nervosa patients

Daniel Rigaud*, Isabelle Tallonneau, Marie-Claude Brindisi, Bruno Vergès

Service d'Endocrinologie-Nutrition, CHU Le Bocage: 2, Bd du Maréchal de Lattre de Tassigny, 21000 Dijon, France

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SUMMARY

Background & aims: To report the prognosis in 41 anorexia nervosa (AN) patients suffering from very severe malnutrition (mean BMI: 10.1 ± 0.57 kg/m^2).
Patients and methods: Compared with 443 less malnourished AN patients, the 41 patients were older (27.8 ± 5.4 vs 22.4 ± 2.1 yrs), their AN was longer (9.6 ± 3.4 vs 5.0 ± 1.5 yrs) and more often of the restrictive subtype ($P < 0.05$).
Results: In 27% of the patients, all nutritional marker levels were in normal range. All patients received a prudent tube-refeeding: energy was increased from 12 to 40 kcal/kg/day, protein from 1.0 to 1.5 g/kg/day within 10 days. During stay, 1 patient died, 2 others suffered from myocardial infarction, 2 others from acute pancreatitis, and 5 from mental confusion. Compared with the other 443 AN patients, the 40 remaining patients had worse 6-yr prognosis: 2 died (7% vs 1.2%), 29% had severe outcome (vs 10%), and only 41% recovered (vs 62%).
Conclusion: In AN patients with BMI < 11 kg/m^2, a prudent tube-refeeding could avoid short-term mortality, but long-term prognosis was bad.

1. Introduction

Anorexia nervosa (AN) is a chronic and severe eating disorder. In Burgundy (France), its frequency was estimated at 1.6% of the 25–45-yr old girls and young women.[1] AN was defined as the follow: 1 – a refusal to gain or maintain body weight at or above a minimally normal weight for age and height, 2 – an intense fear of gaining weight or becoming fat, even though under weight, 3 – a disturbance in the way one's body weight or shape are experienced, an undue influence of body weight or shape on self evaluation, or denial of the seriousness of the current low body weight, 4 – amenorrhoea (at least three consecutive cycles). Weight loss was, at the meaning of these patients, the only way for obtaining their self-esteem. The fear of becoming fat increased month after month, pushing the patient into more intensive restricting dieting. At least one third of the patients are unable to eat during meals any sugar and sweet, added fat and fatty food, meat and fish, cheese, starchy food and bread, milk and cheese. This very low calorie diet was responsible to a very low intake of a lot of macronutrients and micronutrients: total protein, essential amino acids, total fat, essential fatty acids, calcium, phosphorus, iron, zinc and vitamins. In many cases, this diet is responsible for malnutrition. The frequency and the severity of this malnutrition could be increased by excessive physical exercise, which occurs in 40–60% of the AN patients,[2] and by purging (i.e. self vomiting), which occurs in 30–40% of the patients (both during and beside binge eating). About 5–15% of the AN patients died after 10 years of the condition.[3,4] This is mainly due to the malnutrition, in particular in the restricting type of the disease.[3,4] AN is one of the most frequent causes of malnutrition in girls and young women. It is not unusual to find patients with a body mass index (BMI) lower than 13 kg/m^2. It was suggested in the past that a BMI lower than 10–11 kg/m^2 was the limit of life in adults.[5] Furthermore, the refeeding syndrome could increase the risk of dead in the most severely malnourished patients.[6–9] No studies have reported the short-term and long-term prognosis of these patients. So, we would like to report our experience in 41 very severely malnourished AN adult patients hospitalized for malnutrition in our Nutrition unit. All these patients had a BMI < 11 kg/m^2 at admission and were followed-up more than 6 years.

2. Patients and methods

2.1. Patients

The main characteristics of these 41 patients were compared with those of 443 less malnourished AN patients (Table 1) followed during the same period.[10] The 41 very severely malnourished

* Corresponding author. Tel.: +33 3 80 29 52 72; fax: +33 380 293519.
E-mail addresses: daniel.rigaud@chu-dijon.fr (D. Rigaud), isabelle.tallonneau@chu-dijon.fr (I. Tallonneau), marie-claude.brindisi@chu-dijon.fr (M.-C. Brindisi), Bruno.verges@chu-dijon.fr (B. Vergès).

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Table 1
Comparison of baseline demographic and clinical characteristics of women with severe and less severe malnutrition hospitalized for treatment of anorexia nervosa.

	BMI < 11 kg/m^2	BMI ≥ 11 kg/m^2
Number	41	443
Sex	39 women (95%), 2 men	428 women (96%), 15 men
Height (cm)	160 ± 3[a]	165 ± 5
Weight (kg)	25.9 ± 1.4[b]	$39.7 + 5.7$
BMI at admission (kg/m^2)	10.1 ± 0.57 (8.8–10.9)[b]	14.6 ± 2.2 (11.1–17.0)
Age at admission (median, extremes)	28.9 ± 5.4 yrs (25 yrs; 17–45)[a]	24.3 ± 6.1 yrs (22 yrs; 15–32)
Age at the first symptoms (yrs)	18.2 ± 4.7 (19 yrs; 14–31)	17.5 ± 2.3 (19 yrs; 15–28)
Duration of AN (yrs)	9.6 ± 3.4 (7 yrs; 1.4–25.0)[a]	5.0 ± 1.5 (4 yrs; 1.1–14.5)
Physical hyperactivity (recently)	35 (85%)[c]	332 (60%)
Restrictive form	35 (85%)[c]	317 (57%)
Vomiting without binge	5 (12%)	77 (14%)
Binge-eating/purging form	1 (5%)	159 (36%)
Severe anxiety (Hamilton score>40)	9 (22%)[c]	202 (37%)
Severe depression (Beck score>20)	4 (10%)[c]	102 (23%)
Personality disorders	1 (2%)	23 (4%)

Mean $\pm$ SD (median; extremes).
The Hamilton and Beck scores were two validated scores. Maximal Hamilton anxiety score is 56 and maximal depression Beck score is 36. Physical hyperactivity was defined using a 8-items questionnaire. Personality disorders: diagnosis by psychiatric interview.
[a] $P < 0.05$ (Student t test).
[b] $P < 0.001$ (Student t test).
[c] Chi-2 ($P < 0.05$).

patients represented 8.5% of this cohort. They were older, had a longer duration of AN and were more likely to have the restricting form of the disease; they were also more likely to be overactive, and less likely to be very anxious or depressed than were the 443 others (Table 1; $P < 0.05$ for all).

2.2. Methods

All the 41 patients were hospitalized in emergency in a specialized Nutrition unit with a large experience in renutrition of such AN patients. Our unit is not an intensive care unit. Among these AN patients, only two needed to be admitted after one to two days in the intensive medical care unit for multiple organ failure (see below). In each patient, we measured body weight each day, resting energy expenditure, body composition and biological markers as seen below.

2.3. Nutritional rehabilitation

Our schedule was codified and summarized in guidelines for medical staff from 1992. All values are given by reference of actual body weight. It was (and it is) the following.

2.3.1. Day 1

A catheter was inserted into a cubital vein (or, if needed, in a central vein). An intravenous infusion of glucose was prescribed, with 30–40 mL/kg body weight of water/day and no more than 3 g glucose/kg BW/day. Phosphorus (0.20 mmol/kg BW/24 h, phosphate di-potassique), KCl (0.1 g/kg/day), sodium (NaCl, max: 2 g/day, except in the case of vomiting and dehydration), vitamins, minerals (iron, selenium, zinc…) were added in the form of parenteral solution (Cernévit®, Nonan® or similar).

2.3.2. Day 2

A chariere-08 or 09 nasogastric tube was positioned in the distal part of the stomach and its position controlled (nasal mark: 70 cm; radiography for control). Except in the case of patent dehydration, sodium input did not exceeded 3 g/24 h. No food was allowed. Were intravenously infused water (max 40 ml/kg/24 h), sodium (<3 g/24 h), phosphorus (Phocytan: glucose: 1 g, phosphate 6.6 mmol, phosphorus: 200 g, Na+: 0.8 g), calcium (500 mg), trace elements and vitamins (Decan® and Cernevit®: one bottle plus vitamin B1: 100 mg) and fifty (50 mL) intravenous lipids (Intralipid® 20% or Ivelip® 20%), the latter to correct essential-fatty acids insufficiency. Enteral mixture (Sondalis®, Nutrison® or Normoréal®) was intragastrically infused at the mean rate of 25 kcal/kg/day (extr: 21–25 kcal/kg/day).

2.3.3. Days 4 and 5

Energy intake was increased to 35 kcal/kg/day (extr: 780–950 kcal/day), including 100 mL intravenous lipids (200 kcal). Micronutrients were intragastrically infused at the above dose and phosphorus increased (added, Phosphoneuros®: 20 drops $\times$ 2/day intragastrically), according to phosphorus plasma level. No food was allowed.

2.3.4. Days 6–10

Generally, intravenous infusion was stopped. Energy intake was maintained at 35–40 kcal/kg/day. Other intakes (minerals, trace elements, vitamins) were at this time infused via the nasogastric tube. Potassium was increased in cases of hypokaliemia. Sodium input was maintained at <3 g level per day, except in 6 patients: 3 for diarrhoea, 1 for vomiting, 1 for fever and 1 for tubular sodium loss. During this 10-day period, body weight should not increase by more than 100 g/day, since energy input was at the level of energy expenditure.

2.3.5. Days 11–21

Foods were introduced, in the form of small meals (around 300–400 kcal/day) having a low-sodium content (<4 g/day). Energy intake was calculated each day in order to give no more than 45 kcal/kg actual BW/day, including enteral feeding, until the 20th day. For example, for a body weight of 30 kg, the maximal energy need was calculated (1350 kcal/day): if energy intake by meals reached 850 kcal, tube feeding input was reduced to 500 kcal/day. The daily calcium and phosphorus doses were 500 and 300 mg, respectively (except in cases of deficiency). During these 3 weeks, no psychotropic drug was allowed. From the 4th week onwards, energy intake was determined as the energy needs +700–1000 kcal/day, in order to obtain a BW gain from 0.7 to 1.0 kg/week. Daily energy need was calculated as resting energy expenditure (REE, measured) $\times$ 1.5. The diet was a low-sodium diet with no more than 6 g NaCl/day, until a 15-kg/m^2 BMI was obtained.[11]