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The medical risks of severe anorexia nervosa during initial re-feeding and medical stabilisation

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SUMMARY

Background & aims: Objective evidence about the risks associated with anorexia nervosa and how to manage them, is limited. The aim of this study is to describe the medical risk profile, management and outcomes of a cohort of patients with severe anorexia nervosa (sAN) during medical stabilisation treatment.

Methods: Retrospective analysis of case records gathered medical risk data for a 90 day high risk period, on 65 patients with sAN admitted to two specialist services. Prospectively established definitions of medical risk variables and significant complications were applied to the data to describe the risk profiles and outcomes.

Results: Amongst this population with an average initial BMI of 12.8 kg/m^2, 74% developed no significant medical complications. Oral re-feeding over 60 days achieved an increase in mean BMI to 14.4 kg/m^2 and mean weight gain of 4 kg. No patients developed severe hypophosphatemia (<0.45 mmol/L) or any other indicators of a re-feeding syndrome. All the medical complications that arose were temporary.

Conclusions: Initial re-feeding and medical stabilisation of patients with severe AN can be managed safely in specialist inpatient and community settings with slow re-feeding. Although the prevalence of complications was shown to be low, slight worsening of medical risk markers and increased incidence of complications did occur during initial re-feeding. The limited comparable published data appears to support slower rates of re-feeding, showing fewer abnormal results and complications. There is however a need for a definitive prospective multi-centre observational cohort study to investigate risks factors, and the effects of treatment on medical outcomes, in a large sample with varied rates of re-feeding.

1. Introduction

There is good practice guidance about the management of medical risks associated with anorexia nervosa [1–6], yet objective evidence supporting such guidance is limited. There is even less objective evidence to guide clinicians on when a patient with anorexia nervosa (AN) requires inpatient admission for medical stabilisation. Mean BMI provides an approximate indication of medical risk. Studies published in the last 5 years describing mean BMI for patient cohorts on admission to specialist inpatient services, range from 11.3 [7] to 16.2 [8]. It is clear from this simple marker and descriptions and commentaries in other articles, that there is marked variation in the management of medical risk for people with severe anorexia nervosa (sAN) [9–18]. This is in large part because there is a lack of adequate research to guide evidence-based practice.

There are known medical risks in sAN. Rigorous recent meta-analyses have estimated Standardised Mortality Ratio's (SMRs) of 5.2 [19] and 5.9 [20] respectively. Published mortality rates for populations of patients with severe Anorexia Nervosa, over varied timescales, describe mortality rates ranging from 4% [21] to greater than 10% [22,23]. Rosling and colleagues [22] describe a SMR of 10 in their 14 year follow up study of patients treated in an ED inpatient unit, rising to an SMR of over 30 for those with lowest recorded BMI's of less than 11.5.

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Re-feeding syndrome is a risk but it is unclear how common it is and how to mitigate against it, with many varying views. Rates of re-feeding used in treatment vary substantially, with higher rates in North America and Australia, but lower rates in Europe [13,24–27]. There are many other potential causes of death or serious medical sequelae in sufferers of sAN, including cardiac, gastro-intestinal, hepatic, renal, and pancreatic complications. Although there are some important studies of medical outcomes in patients with sAN [7,9,11,13,18,24,28], the sample sizes are not large enough to reliably establish the frequency of serious adverse medical outcomes, as these are relatively uncommon. Furthermore, the data gathered on risk factors and medical complications varies between studies making comparisons difficult.

Inpatient treatment services for patients with sAN vary hugely, from specialist physician led units [13] to specialist psychiatrist led units [8], to non-specialist psychiatric or medical units. There are a small number of community services providing treatment for patients with sAN [21,29,30]. For cost-effective yet safe treatment services to be developed for people suffering sAN, we require a greater understanding of the frequency and nature of the medical risks arising in both community and inpatient settings.

The primary aim of this study is to describe the medical risk profile, the medical and dietetic management and the medical outcomes of a cohort of patients with severe anorexia nervosa (sAN), treated in two services. The secondary aim is to establish and test a methodology for defining and collecting reliable data on a set of risk profile variables and serious medical complications that could be used in a future prospective multi-centre study.

2. Method

2.1. Study setting

The *Naomi Unit* at The Retreat Hospital (York, England), is an inpatient multi-disciplinary eating disorders service treating people with anorexia nervosa. The unit uses a recovery focused pathways model, aiming for medical stabilisation and skills acquisition followed by transfer of skills to the home environment. The mean length of treatment in the service is slightly over 6 months. The *Anorexia Nervosa Intensive Treatment Team (ANITT)* at the Royal Edinburgh Hospital (Edinburgh, Scotland) is a community multi-disciplinary service exclusively treating people with anorexia nervosa who have reached a starvation state. The service uses a psychotherapy-based model based on the concept of core needs [21]. Length of treatment ranges from 2 years to continuous (for patients remaining at persistent high risk).

Both services are multi-disciplinary yet have psychological formulation and therapy central to their treatment approach. The *ANITT* service offers treatment 5 days a week in the patient's home environment or an outpatient clinic, with maximum direct staff contact of approx. 3 h per day and a minimum of approximately 2–3 h per week. The *Naomi Unit* patients are cared for in a ward environment with seven days a week staff availability. Daily direct staff contact ranges from 3.5 to 5 h per day.

The *ANITT* service aims to initiate re-feeding at around 20 kcal/kg/day and to increase by 200–300 kcal every 3–4 days, although rates of re-feeding are individually tailored. Patients in the community may not comply fully with the prescribed rate, so actual consumption may be lower. All patients are prescribed a multivitamin and thiamine, but again do not always comply. If dietetic assessment reveals a deficit in phosphate intake and the patient is judged unable to increase phosphate rich foods such as dairy products to correct this, or serum phosphate levels are low, an oral phosphate supplement is prescribed. Oral nutritional supplements are used infrequently. Naso-gastric feeding is never used. Twice weekly medical monitoring consists of vital signs, and blood screens (including electrolyte and phosphate levels) as the standard initial regime. Medical monitoring is carried out by the specialist nurse or the consultant psychiatrist. This is supported by active specialist dietetic management and the monitoring of symptomatic presentation by all members of the multi-disciplinary team at appointments.

The *Naomi Unit* initiates re-feeding around a rate of 30 kcal/kg/day with individual assessment determining the starting rate and a standardised eating plan prescribed. The rate is increased to the next stage of the standardised eating plan at day 4, unless there is a strong clinical reason not to. All patients are prescribed a multivitamin, thiamine and vitamin B and tend to comply. The standardised eating plans are rich in phosphate so oral phosphate supplements are only prescribed if indicated by serum levels. Oral nutritional supplements are not used unless there is a medical reason, such as malabsorption, necessitating this. Naso-gastric feeding is not used on the *Naomi Unit*. Patients are symptomatically monitored in the inpatient setting, with input from the consultant psychiatrist, specialist dietitian and the team of two specialist nurses per shift. Vital signs are monitored 4 hourly initially with blood screens, including phosphate and electrolyte levels daily. The frequency of monitoring reduces as risks reduce.

2.2. Study design

All patients admitted to either service over a five year period from July 2008–July 2013, with a diagnosis of anorexia nervosa and a BMI of $\leq$13, or BMI $\leq$15 and weight loss of $\geq$1 kg in the preceding month, were included in the study sample. This defines a population with sAN.

Using existing literature and in consultation with a consultant physician, definitions of thirty-eight risk profile variables (RPV's: see Appendix A) and twenty-one significant medical complications (SMC's: see Appendix B), were established. The RPV's cover a broad range of clinical examination and investigations such as BMI, heart rate, serum potassium levels, serum phosphate levels; and dietary and behavioural factors such as kilocalorie intake, purging behaviour, and alcohol use. The group of SMC's were chosen to reflect a broad range of possible adverse outcomes, including severe biochemical or haematological disturbance which would inevitably be associated with significant symptoms and risks, e.g. hyponatraemia <120 mmol/L.

Data collection involved review of case-notes and electronic investigation results systems. Demographic, risk profile, treatment and outcome data on the sample was gathered. Estimates of daily kilocalorie (kcal) intake, lowest daily kcal intake and phosphate intake were carried out by specialist dietitians. For community-based patients the estimate relied on patient report and dietetic assessment, with some inevitable reduction in confidence of accuracy. We defined a 90 day high risk window, with three time periods for data collection: the 30 days including and preceding the day of entry to the service, during which the patient was deteriorating; day 1–30 of treatment with initial re-feeding and stabilisation; and days 31–60 of treatment with further re-feeding and stabilisation. All data used in this study was collected as part of routine clinical care and collated retrospectively.

Univariate statistics were used to describe the sample, risk profiles, treatment interventions and outcomes. For categorical variables, data are expressed as frequencies and percentages. For continuous variables, data are expressed as means with standard deviations (SDs) for normal distributions and as medians and interquartile range (IQR) for non-normal distributions. Changes in risk profile variables between the time periods were explored using paired sample t-tests for normal distributions, Wilcoxon signed

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