Clinical Profile of Adolescent Onset Anorexia Nervosa at a Tertiary Care Center

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Received: March 25, 2020; Initial review: April 11, 2020; Accepted: September 22, 2020.

Anorexia nervosa is an eating disorder characterized primarily by an altered perception of body image, resulting in significant weight loss and is influenced by bio-psychosocial factors. In India, anorexia nervosa is increasingly recognized as a cause of morbidity and mortality among adolescents. The reported lifetime prevalence of anorexia nervosa is 0.5-2%, with a peak age of onset around 13-18 years [1]. Literature reveals a changing epidemiology of this disorder, with increasing rates of eating disorder being diagnosed in younger children and in males [2-5]. Though the prevalence of eating disorders is higher in Western countries, there is an increasing trend of case reports in India [5]. With increasing incidence of anorexia nervosa in children, pediatricians become the first point of contact for many cases.

Our study aims to describe the clinical profile of adolescents admitted with anorexia nervosa in a tertiary care center in Southern India.

METHODS
This was a hospital record review of adolescents hospitalized with anorexia nervosa and their follow up after atleast one year of discharge. We reviewed the data of adolescents (aged 10 to 18 years) who were admitted either in the adolescent medicine facility or the child and adolescent psychiatry unit between May, 2006 and December, 2019, and details of patients with a diagnosis of eating disorder or anorexia nervosa were extracted. Adolescents who fulfilled the DSM-V criteria for anorexia nervosa or other specified eating and feeding disorders (OSFED) were included in this study. Those with diagnoses of bulimia nervosa, psychogenic vomiting or unspecified feeding disorders were excluded.

Data regarding the clinical profile and hospitalization was collected from the hospital database. Follow up of these patients was done after atleast one year of hospital discharge following initial hospitalization, either by an outpatient visit or a telephonic interview. Information regarding clinical symptoms, weight gain, and school performance was collected.

Data entry and analysis was done using Epidata software.

RESULTS
Over the 13 year 8 month period, 43 adolescents of whom 12 (27.9%) were males, were studied. Anorexia nervosa restricting type was the diagnosis in 23 (53.4%) adolescents, and 9 (20.9%) had binge-purge type. Other specified feeding and eating disorders (OSFED) was diagnosed in 11 (25.5%).
The mean (SD) age at presentation was 13.4 (1.7) years and the mean (SD) age at onset was 12.4 (1.8) years. The youngest patient was 10 years old. 21 (48.8%) adolescents had a BMI below the 3rd centile, with one patient having a BMI of 8.3 Kg/m². Loss of appetite and abdominal pain were the two most common presenting symptoms seen in 30 (69.7%) and 20 (46.5%) patients, respectively (Table I). The mean (SD) calorie intake at presentation was 388 (247) calories per day. The most common triggers were peer pressure seen in 15 (34%) patients and family history of overt eating disorders or a significant adult who was reportedly health conscious in 8 (18.6%) patients. Menstrual irregularities were present in 19 (61.2%) adolescent girls, of whom 5 (26.3%) had primary amenorrhea and 10 (52.6%) had secondary amenorrhea. Co-morbid conditions such as obsessive compulsive disorder or depression were present in 11 (25.5%) patients. There was a family history of psychiatric illness in 9 (20.9%) patients. Microcardia was present in 21 (48.8%) adolescents. The ECG changes seen in 6 (13.9%) adolescents included sinus bradycardia, QT prolongation and T wave changes. Echocardiography was done in five adolescents and was normal. Seven adolescents had MRI of the brain and abnormal findings were present in 5 (71.4%) of them. The abnormal findings included cerebral atrophy, white matter volume loss, periventricular hyperintensities and pituitary changes. Bone mineral density was done in 4 patients, 2 (50%) of whom had low mineral density.

Of the 43 adolescents, 33 (76.7%) were admitted for nutritional rehabilitation [mean (SD) stay, 13.7 (5.5) days]; the remaining 10 did not require hospitalization for medical treatment. Of the 33 admitted, 15 required initial feeding via nasogastric tube, while 1 patient required nasogastric feeds even at discharge. Hemodynamic instability was present in 12 (36.3%) of these patients, and refeeding syndrome was diagnosed in 10 (30.3%) of these patients. At discharge, the average daily calorie intake was 1935 calories and the average weekly weight gain was 1.1 kg.

Of the 43 patients, 10 (23.2%) were yet to complete a 1-year follow-up period and 18 (41.8%) were lost to follow-up. One child died 18 months later with severe hemodynamic instability, and complications of electrolyte imbalance, coagulopathy and shock. Of the remaining 14 (32.5%) patients, 2 (14.2%) persisted to have symptoms, 1 (7.1%) patient had become overweight, and the remaining 11 (78.5%) had normal weight for age.

DISCUSSION

The proportion of males in the study was higher than other studies in adolescents, which reported a male proportion of 9-15% [4, 6]. Possible reasons for this include improved awareness and diagnoses, and the ease of families to attend an adolescent medicine clinic, thereby avoiding the stigma of referral to psychiatry. The age of presentation and onset was similar to data from Western studies [6,7], while the age of onset was lower than that reported in Asian studies [8,9]. The average BMI at presentation was similar to that seen in other studies [8,10]. Some adolescents who were overweight or obese prior to onset of symptoms, had a significant weight loss over a short period of time and their BMI at presentation was normal; the adolescents in this group were either the binge-purge type or the OSFED category.

Adolescents in the younger age group had higher percentage of the binge-purge type of anorexia nervosa, while those in the older age group were of restrictive type. This finding is slightly different from previous studies, which show the younger age group to be more of the restrictive type [9]. The most common identified trigger

| Table I Clinical Profile of Adolescents With Anorexia Nervosa at Presentation (N = 43) |
|------------------------------------------|-----|
| Characteristic                          | Value |
| Duration of symptoms, mo              | 12.2 (9.2) |
| BMI at presentation, kg/m²             | 13.8 (3.2) |
| Weight loss                            | 43 (100) |
| Loss of appetite                       | 30 (69.7) |
| Vomiting                               | 15 (34.8) |
| Abdominal pain                         | 20 (46.5) |
| Bloating                               | 11 (25.6) |
| Dizziness                              | 14 (32.5) |
| Cold intolerance                       | 6 (13.9) |
| Excessive exercise                     | 12 (27.9) |
| Peculiar eating pattern                | 11 (25.5) |
| Fear of weight gain                    | 20 (46.5) |
| Use of laxative/diet pills             | 2 (4.6) |
| Lanugo hair                            | 4 (9.3) |

Values are expressed as no. (%). BD: Body Mass Index.
factors were peer pressure and family influence, similar to data from other studies [9-11].

Mortality rates reported in adolescents [7,12,13] are lower compared to adults with anorexia [9,14,15]. Our small cohort size precludes comment on mortality, but further studies are required to better estimate mortality and outcome. The poor follow-up in our patients reflects the inability of the family to understand the severity of disease, stigma of a psychiatric illness and financial burden of treatment on the family.

Our data will assist pediatricians in identifying anorexia nervosa early, and lead to appropriate diagnosis and management to improve overall outcome.

**Ethics clearance:** Ethics Committee, Institutional Review Board, Christian Medical College, Vellore; 11511, dated September 3, 2018.

**Contributors:** MMB: concept and the study design was done; KEP, RJR, RYS, MMB: material preparation, data collection and analysis were performed; RJR, KEP: written first draft of the manuscript; MB, PM: revision of the manuscript; MB: final approval of the manuscript. All authors have read and approved the manuscript.

**Funding:** None; **Competing interests:** None stated.

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