To Our Readers

Wish you all a very Happy New Year 2004!

The first issue of the Update Series on "Nutrition in Disease Management" this year (Number 21) features two review articles and a case study.

The first review article provides information about food allergy and likely causative factors—a subject which has aroused the interest of individuals actively engaged in nutrition research as well as practising clinicians and dietitians. It also draws our attention to the limitations of relying on a single investigative technique and suggests a practical approach to diagnose and manage the situation.

The second review article provides us with information acquired from several recent trials on nutrition research in oncology.

As already mentioned in the previous issue of the Update Series, it will from now onwards regularly feature an interesting case study describing details of nutritional intervention and approach to dietary modification.

We invite all individuals involved in nutritional support—clinicians, dietitians and nutritionists to regularly send us details regarding a patient in their set-up who required aggressive efforts at nutritional intervention, in the form of a case study (3-4 pages). These case studies will be scrutinized and if found suitable, will be published in subsequent issues of the Update Series.

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Food Allergy: A Practical Approach to Diagnosis and Management

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In recent years, food allergy has been a subject which has generated considerable interest. This can be attributed to awareness generated as a result of increased reporting of allergic reactions all over the world. The incidence of food allergy has been reported to be 2-12 per cent in the West.

The task of identifying the offending agent or agents responsible for symptoms of food allergy is a challenging one. The problem is compounded further by the fact that the symptoms of food allergy are not restricted to the gastrointestinal tract and, in fact, may be observed in other parts of the body. The inability to detect food allergy in a timely manner or attributing symptoms mimicking those of food allergy to an underlying immune mechanism may lead to both over-reporting and under-reporting the problem. The importance of a properly taken history as a useful tool in diagnosing food allergy cannot be overemphasised.

It is important to understand the mechanisms involved in food allergy which is an entity distinct from food intolerance. Food allergy or hypersensitivity is an adverse reaction to food in which there is evidence that the reaction is caused by immunological response to the food item 1, 2. . Food intolerance, on the other hand, is a reproducible adverse reaction to a specific food item which is not psychologically based and occurs even when the subject cannot identify the type of food which has been administered 3.
All types of food allergy involve two processes – production of IgE and mast-cell mediated response. An individual has an inherited predisposition to form IgE against a specific food item. It has also been observed that in such individuals, a family history of allergy is common and the probability of developing symptoms related to food allergy is increased considerably when more family members are affected. The following immune mechanisms have all been implicated in food allergy:

- Immediate hypersensitivity (anaphylactic) reaction (IgE mediated)
- Antibody – dependent cytotoxic hypersensitivity (IgM or IgG mediated)
- Immune – complex mediated hypersensitivity
- Cell – mediated hypersensitivity.

The sequence of events involved in producing the symptoms of food allergy are shown in Figure 1.

**Figure 1**

[Diagram showing the sequence of events involved in producing the symptoms of food allergy.]

1. **Exposure to offending food**
2. **Interaction of offending food with IgE attached to mast cell**
3. **IgE attaches to mast cell surface**
4. **IgE production and release**
5. **Release of chemical substances (e.g. histamine)**
6. **Respiratory symptoms**
7. **Dermatological symptoms**
8. **GI symptoms**
Food allergens are proteins which are resistant to the effects of heat (cooking), gastric hydrochloric acid and digestive enzymes. As a result, they survive to cross the gut mucosal lining, enter the bloodstream and cause an allergic reaction. The symptoms produced may be experienced in any part of the body.

Food allergy in children has some features which are different from those encountered in adults. Children, unlike most adults, can outgrow their allergy. The most common food allergens encountered in children are eggs, milk and peas-nuts 4. Fish and wheat have also been recognised as sources of food allergens, but to a much lesser extent. Milk and soy allergy are easy to outgrow as compared to symptoms produced by allergens in peanuts and seafood.

A child with allergy to a specific food item may be allergic to other similar foods as well. This phenomenon is termed cross-reactivity and must be kept in mind during managing an individual with symptoms of food allergy 5. In certain situations, when the allergic reaction to a specific food item is very severe and potentially life-threatening, the individual must be counselled to avoid all other foods of a similar nature.

CLINICAL MANIFESTATIONS

The manifestations of food allergy may be restricted to the gastrointestinal tract, involve organ systems in addition to the gut or may even occur in other parts of the body without involvement of the gastrointestinal system. The clinical presentation may be one with manifestations predominantly affecting the gastrointestinal system like vomiting, abdominal pain, watery or bloody diarrhoea, poor weight gain and malabsorption or may be characterised by symptoms and signs involving areas of the body other than the gut – cough, wheezing, rhinitis, atopic eczema, urticaria and angioedema 6.

DIFFERENTIAL DIAGNOSIS

When a child is brought to the paediatrician by the parents saying, "Doctor, I think my child is suffering from a food allergy!", many other clinical situations which mimic symptoms of food allergy must be considered. Contamination of food with microorganisms such as Salmonella or toxins such as the botulinum toxin can result in food poisoning characterised by symptoms indistinguishable from food allergy. The difference is that such food poisoning is not immunologically mediated. Natural substances found in some foods (for example, histamine in some types of cheese) are known to produce symptoms similar to those of food allergy. There may be intolerance to additives present in certain foods or specific food intolerance due to deficiency of a particular enzyme (for example, lactose intolerance), all of which are not immune mediated.

DIAGNOSIS

Several methods have been employed to diagnose food allergy such as exclusion of the offending agent, double-blind placebo-controlled food challenge, serological techniques and intestinal biopsy. Increased levels of duodenal fluid IgE have been observed in patients with food allergy who predominantly have gastrointestinal manifestations.

However, the investigative laboratory methods used to diagnose food allergy have their limitations. The scratch test is very sensitive but a positive result is not to be interpreted as food allergy. A poor correlation has been observed between the scratch test and gastrointestinal symptoms whereas a good correlation exists between the scratch test and both respiratory and dermatological manifestations 7.

The radio-allergosorbent test (RAST) measures radio-labelled anti-IgE and is semi-quantitative. It is not influenced by drugs, involves limited selection of allergens, relatively expensive and the results have considerable interlaboratory variability. There is an increased likelihood of overinterpretation of results.

The Double Blind Placebo-Controlled Food Challenge has been described as the gold standard for the diagnosis of food allergy but even this investigative modality has limitations. It is useful in confirming diagnosis when an individual reacts to one or a few suspected foods. However, its utility is limited when there is a history of severe allergic reactions or the need to test for allergy to multiple food sources arises. It is not only expensive but also time-consuming and used most commonly in clinical practice when the treating paediatrician has reason to believe that the reaction is not due to a specific food and wants to obtain evidence to support this viewpoint.
Currently, diagnosis of food allergy is based on:

- Exclusion of the offending agent or agents from the diet
- Disappearance of symptoms of food allergy on exclusion of the offending food and
- Reappearance of symptoms of food allergy on challenge with the offending food.

The only effective treatment of food allergy is dietary avoidance of the offending food.

COW’S MILK PROTEIN ALLERGY

Unlike other forms of food allergy, allergy to cow’s milk protein presents early in infancy and is usually completely reversible after two years of age. All the four mechanisms of immune-mediation have been documented in cow’s milk protein allergy. The symptoms of cow’s milk protein allergy may be acute 4, wherein other atopic features are marked (dermatological and respiratory manifestations) in addition to gastrointestinal symptoms or insidious with no atopic features and a gradual onset of gastrointestinal manifestations. The histologic changes in the small intestinal mucosa are non-specific, but crypt hyperplasia is not a feature.

The diagnosis of cow’s milk protein allergy is based on:

- Disappearance of symptoms after elimination of cow’s milk and milk products from the diet.
- Recurrence of identical symptoms after challenge with cow’s milk after one year of age.

A graded desensitisation technique is preferred 8 during reintroduction of cow’s milk after two years of age in infants with cow’s milk protein allergy who had presented in early infancy with severe atopic features but such desensitisation is not required if the onset of symptoms was insidious and restricted to the gastrointestinal system. A small proportion of children allergic to cow’s milk protein may also to be allergic to soy 9, 10.

CONCLUDING COMMENTS

The management of a child with food allergy is a complex and challenging problem. Till date, there is no single laboratory test available which can conclusively confirm the diagnosis of food allergy. The limitations of the investigative modalities available are more clearly evident when the disorder presents with manifestations restricted to the gastrointestinal system. Exclusion of the offending food from the diet is the only effective treatment. Disappearance of symptoms on withdrawal of the offending agent and reappearance of identical symptoms on reintroduction of the offending food is the most reliable method for diagnosing food allergy.

REFERENCES

6. Tips to remember – food allergies. Academy of Allergy, Asthma and Immunology. Website: http://www.aaaai.org/patients/publicedmat/tips/foodallergy.stm
Emerging Concepts in Nutrition in Cancer Patients

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Dispel from your mind the thought that an understanding of the human body in every aspect of its structure can be given in words.

Leonardo da Vinci.

Over the years, significant advances have been made in nutrition support in oncology but there is a considerable scope for improvement on the basis of results of recent trials involving nutrition research in oncology patients. The information so gained can be effectively used to plan strategies of nutritional support to the patient population concerned.

Nutritional support of the oncology patient is now possible at many different levels. Technology has evolved to permit parenteral and enteral support in a majority of patients. The principal questions which need to be answered include which patients will truly benefit from enteral support, when the support should be delivered, and by what route.

It has been established by randomised clinical trials that only patients with severe malnutrition defined by significant unintended weight loss and/or low albumin levels will actually benefit from preoperative parenteral nutritional supplementation. In the postoperative period, the majority of cancer patients will not need parenteral nutritional support because their gut will regain normal function within 10 to 14 days. For the patient in whom oral nutrition cannot be initiated by the second week after surgery, appropriate supplemental nutrition is indicated. The enteral route is preferred, unless contraindicated. Aggressive efforts aimed at minimising the effects of severe protein and energy catabolism through optimum nutritional support may be needed in patients undergoing chemotherapy or radiotherapy where intervention related side-effects are prominent.

DIETARY COMPONENTS AND GENES

After unraveling the mystery of the human genome, researchers are trying to manipulate the abnormal signals from faulty genes that disrupt the process of nutrient absorption. If the function of the abnormal gene can be detected early, the gene can be an effective marker of early neoplastic changes and this may help to assess cancer risk and predict the success of preventive and therapeutic interventions.

A lot of work is continuing in constructing libraries of the human genes and their protein products. These libraries are useful in understanding the normal and abnormal growth and function of these genes and their protein products. It is no longer sufficient to know about the nucleic acid sequence of a pertinent gene. It is essential to know which proteins the gene produces and how they work inside the cell because changes in these proteins leading to alteration in cell metabolism is the cause of most diseases. Availability of advanced techniques and methods in the form of two-dimensional gels, protein chips, mass spectroscopy, X-ray crystallography, and nuclear magnetic imaging has been an asset in studying the
Certain chemicals in diet may play a role in killing tumour cells and lessen the effect of an oncogene in a living organism. It has been shown that certain dietary polyphenols kill cancer cells in culture by stimulating apoptosis. If it can be determined how polyphenols affect the cell lifecycle and cause cancer cell death, then bioengineering of food that would enhance this beneficial effect can be carried out subsequently. The safety and cost-effectiveness of such a food can be assessed through evidence-based clinical trials having clearly defined endpoints based on the new molecular markers. Nutrient-derived drugs for treating cancer may become available due to such efforts.

**DIETARY INTERVENTIONS**

It is unlikely that dietary manipulation to treat an advanced malignancy will be effective. For a nutritional strategy to be most effective, the intervention would have to begin either as a preventive measure in the population at high risk of development of various cancers or at a very early stage of the disease when the tumour is still localised. Preventive nutritional strategies are designed for population groups like people with premalignant conditions such as oral leukoplaquia or adenomatous colonic polyps, hereditary non-polyposis colonic cancer, people who have a high risk of developing second primary cancers, for example, Li Fraumi syndrome or suffering a recurrence of their first primary cancer. DNA analysis leading to the detection of mutations in tumour suppressor genes such as the Retinoblastoma gene and the discovery of cancer markers in the blood and tissue help to identify these high risk populations.

The role of elevated dietary fat and obesity in causing increased risk for cancers of the breast, colon, prostate and endometrium has been suggested by various animal studies and analysis of international dietary patterns. If one accepts that the problem of obesity is environmental in nature, caused by poor food choices and lack of physical activity, then reversing and/or preventing obesity would be an effective way to prevent several kinds of cancer.

Retinoid-based chemoprevention has been proven to be useful in patients with oral cancer. Mixed results have been obtained in patients with adenomatous polyps who were given calcium and cereal fibre as a preventive measure, and heavy smokers who were given b-carotene to prevent lung cancer. The role of selenium in the prevention of prostate cancer has recently been reported.

A prevention trial designed to determine the influence of dietary fats on breast cancer recurrence has now completed accrual. The rationale for the trial is that reduced dietary fat could deprive residual tumour cells of stimulatory calories, certain stimulatory fatty acids, or fat-related stimulatory hormones. This is the Women's Intervention Nutrition Study (WINS), which has enrolled nearly 2,500 breast cancer patients in the United States. Subjects treated surgically for cancer and with no known metastatic disease are being randomised to a diet of either 30 per cent or 15 per cent fat calories. The WINS trial should provide the answer to the important question of dietary fat's influence on breast cancer recurrence.

The protection against cancer apparently afforded by low-fat diets may in part reflect exposure to anticarcinogens found in vegetables, fruits, legumes, nuts and grains. Substances found in these foods that may be protective include phenols, sulfur containing compounds, flavonoids, and fibre.

**NUTRITION AND ADVANCED CANCER**

Most patients with cancer lose weight, an exception being patients with breast cancer and some other forms of cancer who maintain their weight fairly well and may even experience weight gain. When weight loss is severe, organs malfunction, infections increase, treatment tolerance decreases, and survival is shortened.

Cancer-associated weight loss is due to both disease-related and treatment-related causes. Chemotherapy and radiation treatment can cause mucositis and gastrointestinal dysfunctions that result
in poor food intake and surgery involving the digestive system may result in problems related to delivery, absorption and effective utilisation of nutrients. The disease itself can cause anorexia secondary to increase in the body of various anorectic cytokines, like tumour necrosis factor-alpha. 11

Fully developed cancer cachexia is associated with a number of metabolic de-rangements that resist effective nutritional and pharmacologic treatment. These problems include reduced appetite, increased protein breakdown with a resultant decrease in lean muscle mass, increased hepatic protein synthesis that may be a source of anorectic cytokines, increased glucose turnover and hepatic gluconeogenesis, and increased lypolysis 11.

Attempts to combat cancer cachexia with enteral or parenteral delivery of supple-mental nutrition have yielded mixed results 12. Patients retained water and added fat, but did not build up lean body mass 13. Pharmacologic interventions have shown mixed results 11,13. The value of newer anti-cachectic strategies such as glutamine supplementation or omega fatty acid and other lipid supplementation, must be proven in clinical trials.

There are a number of unresolved nutritional issues in patients with cancer. One is the failure of any nutritional programme to reverse weight loss in patients with advanced cancer. Traditional nutritional support appears reasonable in the peri-operative period, during aggressive chemotherapy and radiation therapy when intake of food and digestive functions are compromised and in post-treatment patients who have discrete, non-tumour-related nutritional problems such as short bowel syndrome, difficulty in swallowing, or esophageal obstruction.

Effective nutritional strategies against cancer cachexia must be based on a de-tailed knowledge of cachectic mechanisms. Our knowledge of these mechanisms is incomplete, although encouraging preliminary data have been obtained with adenosine triphosphate (ATP) infusions in advanced non-small cell lung cancer patients 14 and omega-3 fatty acid supplementation in cachectic pancreatic cancer patients 15. The modulation of acute-phase responses by omega-3 fatty acid may also be useful. The reasons for ATP infusions having positive nutritional effects are not clear, but they appear to replenish both fatty and muscle tissue 14. Double-blind, placebo-controlled trials of both interventions, perhaps in combination, appear warranted.

CONCLUSION

There is definite evidence of nutritional elements playing a role in prevention and possibly treatment of various cancers. The molecular basis of these elements helping in management and prevention of cancer needs further research and is ongoing. It needs to be emphasized that success can only be achieved through combined efforts of basic scientists, clinical scientists, the professional oncology team, and people who are at risk for developing cancer working together.


Centre for Research on Nutrition Support Systems (CRNSS), New Delhi and Apollo Centre for Advanced Paediatrics (ACAP), Indraprastha Apollo Hospital, New Delhi are jointly organizing a two-day course on Practical Paediatric Nutrition from March 6 to 7, 2004 at the Auditorium, Indraprastha Apollo Hospital.

**Course Highlights**

- Enteral Nutrition – Principles, Prescribing, Protocol and Clinical Case Scenarios
- Parenteral Nutrition – Principles, Prescribing, Protocol and Clinical Case Scenarios
- Exclusion Diets
- Immunonutrition
- Nutrition in the Intensive Care Setting
- Nutrition in the Newborn
- Video Sessions

Registration Fee Rs. 400/ (Rupees Four hundred only) to be sent as a Demand Draft drawn in favour of “Fourth Course in Practical Paediatric Nutrition” payable at New Delhi by February 28, 2004 to the

- Centre for Research on Nutrition Support Systems (CRNSS)
  C-13, Qutab institutional Area,
  New Delhi 110 016

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A lady registered herself at the Diet Counselling and Research Unit (DCRU) of the Nutrition Foundation of India (NFI), New Delhi on August 22, 2003 for weight management. She had already made efforts to lose weight through other weight loss programmes and some crash diets earlier, where she followed major diet restriction and body massage but no physical exercise. She, however, regained the lost weight within a short period.

CLIENT PROFILE

Name: xyz
Age: 25 years
Gender: Female
Weight: 69 kg
Height: 158.5 cm
Pulse rate: Normal
Blood Pressure: 100/70

Lifestyle: Sedentary with recent gym activity, occupation involved traveling and so eating out was frequent, missed breakfast quite often.

Family history: No family history of obesity/overweight/coronary heart disease/ diabetes/hypertension. Only one aunt (second of kin) from maternal side had a thyroid problem.

Diet History: Eating Pattern and Preferences: Enjoyed alcohol on a daily basis, aerated drinks and non-vegetarian food.

24-hour dietary recall showed an approximate intake of:
Energy: 1200 Kcal (+ 300 Kcal for rum and coke)
Protein: 51 g
Iron: 11 mg

Nutrient Adequacy Ratio for iron = Intake/RDA = 0.33
The recall also revealed

- Consumption of full cream milk
- Intake of rum and coke daily
- Very low intake of fresh fruits and vegetables
Medical history: Irregularities in the menstrual cycle, which used to last for 15 days with heavy bleeding. Subject underwent homeopathic treatment for curing it. Now, it was regularised.

Diagnosis: Overweight by 10 kilograms, no clinical signs of deficiencies.

Physical Examination

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<td>Height (cm)</td>
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<tr>
<td>Blood Pressure (mmHg)</td>
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<tr>
<td>Body Mass Index (Kg/m²)</td>
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<tr>
<td>Waist/Hip Ratio</td>
<td>0.86</td>
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Prescription given:

- Continue with the same diet
- Iron content of diet low, so include more of green leafy vegetables, jaggery, rice flakes, lotus stem, etc in the main meals or as snacks.
- Continue with gym routine twice a week. Walk for at least 30 minutes when not exercising.
- Gradual reduction and finally discontinuation of rum and coke. Replace with lemon drink.
- Have fresh fruits instead of juices, as they are more filling. Also, since they are a rich source of vitamin C, it will enhance iron absorption.
- Do not indulge in self-denial but eat proportionately when eating out.
- Use toned/ double toned milk.
- Do not miss breakfast.
- Get haemoglobin levels tested.
- Review after two weeks.

Physical examination on subsequent visit (which was one month later as the client was out of town):

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<tr>
<td>Hemoglobin (g/dl)</td>
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It may be noted that the client had lost 3.4 kg within one month. No other parameters were abnormal and Body Mass Index (BMI) and waist–hip ratio (WHR) too came down.

Prescription given on second visit:

- Drink plenty of fluids, for example, Lime juice after the exercise at gym.
- Do not indulge in vigorous physical exercise to avoid possible precipitation of bleeding. Instead increase the duration of walking.
- Do not starve yourself.
- Include iron rich food in your daily diet with at least four to five servings of fruits and vegetables to attain the objective of increasing haemoglobin to a level above 11g/dl
- Encouraged to continue the same routine.
This case study reveals to us that attitudes towards weight loss should not be centred on drastic reduction in the diet, instead it must focus on burning excess calories by adequate and appropriate physical activity. Physical activity should not be considered separately from other forms of weight loss treatment and weight changes can be expected only when diet therapy and physical exercise are combined optimally, along with the right mental attitude and a strong determination to succeed.

This case study was chosen for publication

- To emphasise the importance of encouragement and warn against the expecta-tion of drastic or quick weight reduction. No supplements were prescribed as the dietary advice given was effectively balancing the nutrients required. The energy intake was not in excess and in fact had to be increased inspite of the client getting a bit surprised that she was asked to increase her energy by no self denial. She gradually replaced calories from the alcohol intake with dietary modification and felt good eating out, but in restricted quantities and balancing total intake through changes in other meals of the day accordingly. She is now set in her routine and since then has not felt the need to consult again. DCRU staff have kept in touch with the client and found her happy and progressing gradually.
- To emphasize that no one printed prescription is applicable to all people. Both client and counselor need to be patient in their attitudes to achieve positive results in the long term.
- To show that problem of overweight can be controlled by counseling, before it becomes a medical problem.

NOTE: The views of professionals in the field are welcome as sharing of views on counseling techniques and weight management methods will only enhance their effectiveness in disease prevention. Alternative strategies that may be sug-gested will be published.