HIGHLIGHTS FROM THE 3RD INTERNATIONAL CONFERENCE ON CANCER NUTRITION THERAPY:

Complex Patients and Early Interventions for Patients Undergoing Cancer Therapy
The 3rd International Conference on Cancer Nutrition Therapy was held in Madrid, Spain, May 9-10, 2012, in association with the Spanish Society for Radiotherapy Oncology (SEOR) at the Ateneo de Madrid, a private cultural society established in 1835 to advance science, literature, and art within Spain. The focus of the conference was on complex patients and early intervention for patients undergoing cancer therapy. Included in the program were sessions on basic science of cancer cachexia, translational science with a focus on sarcopenic obesity, importance of nutritional assessment, early nutritional support during chemo and radiotherapy, and clinical evidence from around the world. Additionally, Abbott Nutrition partnered with SEOR to support investigators and their research with an abstract submission and award program.

For the 3rd year, the conference was chaired by Kenneth C.H. Fearon, M.D., FRCS (GLAS), FRCS (ED), FRCS (ENG), Professor of Surgical Oncology, University of Edinburgh, Scotland. Maria Isabel Correia, M.D., Ph.D., Professor of Surgery, Federal University of Minas Gerais, Belo Horizonte, Brazil, served as Co-chair and Josep M. Argilés, Ph.D., Professor, Cancer Research Group, Universitat de Barcelona, Spain, served as Honorary Chair. The program included 17 speakers from 12 countries with experience in surgical, radiation, and medical oncology, gastroenterology, basic science research, cardiology, palliative medicine, pathology, and nutrition. One hundred forty-eight health care professionals including oncologists, surgeons, internists, palliative care specialists, hematologists, basic scientists, dietitians and a nurse from 21 countries attended this year’s conference.

Representing the SEOR, Jorge Contreras Martinez, M.D., Ph.D., Associate Professor, Faculty of Medicine, University of Malaga, Spain, opened the conference by discussing how cancer is the 2nd leading cause of death worldwide with 1/3 of these deaths related to nutrition. The prevalence of weight loss in people with cancer ranges from 31%-87% and is associated with negative clinical outcomes. The Conference Chair, Professor Fearon, stated in his opening remarks that we are here to think about cancer nutrition therapy and share knowledge. He encouraged everyone to ask questions so that they would come away with a greater understanding of cancer nutrition therapy. In addition, he stated how all cancer patients are not the same; some are obese, sarcopenic, diabetic, or anorexic. He challenged all to think of the complexity of their patients. Patients now are also undergoing cycles of complex treatment. Muscle is the key organ to support; however, adipose tissue is also important.

Basic Science: Fat-muscle physiology in cancer cachexia

Gerald Höfler, M.D., Medical University of Graz, Austria, presented information on fat metabolism in cancer cachexia. Increased lipolysis is seen in cancer cachexia, with patients losing both adipose tissue and skeletal muscle mass. Cancer cachexia differs from anorexia in that it cannot be reversed nutritionally. In comparing body mass between normal and cachectic patients, body fat was markedly reduced in the cachectic patients. Factors released by the tumor (TNF-α, proteolysis inducing factor, IL-6) cause an increase in lipolysis, proteolysis, and resting energy expenditure. The Conference Chair, Professor Fearon, stated in his opening remarks that we are here to think about cancer nutrition therapy and share knowledge. He encouraged everyone to ask questions so that they would come away with a greater understanding of cancer nutrition therapy. In addition, he stated how all cancer patients are not the same; some are obese, sarcopenic, diabetic, or anorexic. He challenged all to think of the complexity of their patients. Patients now are also undergoing cycles of complex treatment. Muscle is the key organ to support; however, adipose tissue is also important.

Cancer Nutrition

Essential amino acids cause an increase in post-prandial muscle protein synthesis that is not dependent on insulin. The decrease in postprandial muscle protein breakdown is mediated by insulin. Dr. Atherton went on to describe the concept of anabolic resistance as a regulator of atrophy/cachexia. Anabolic resistance in muscle wasting has been observed in the elderly and immobile as well as cancer patients.

Dr. Atherton presented unpublished data on his work in protein metabolism in patients with colorectal cancer. Muscle protein metabolism was evaluated in these patients before and after surgery using an isolate labeled mixed amino acid feed infused during the fasted and fed state. Lean leg muscle mass loss was increased 6 weeks after surgery. Additionally, he observed anabolic resistance to muscle protein synthesis and an increase in muscle protein breakdown in these patients before and after resection surgery in postabsorptive and postprandial conditions. Dr. Atherton observed an inverse relationship between percent of lean leg muscle loss (postoperative muscle atrophy) and postprandial muscle protein synthesis, suggesting that maintaining an anabolic response to feeding is a key component of muscle maintenance (limiting postoperative muscle atrophy).

Omega-3 fatty acids have been shown to have a positive effect on muscle protein anabolic response. Dr. Atherton presented results of his study on the effect of omega-3 fatty acids on muscle protein synthesis in older adults. After 8 weeks of supplementation, muscle protein synthesis was greater in omega-3 fatty acid supplemented patients versus the corn oil control group during the hyperaminoacidemic-hyperinsulinaemic clamp period compared to basal. Dr. Atherton posed the question on whether the benefit of omega-3 fatty acids is due to anti-inflammatory or anabolic effects. To evaluate the potential non-anti-inflammatory anabolic effect of long-chain omega-3 fatty acids, he conducted a study in young, glucose tolerant, non-infamed individuals. Similar to what was observed in his study of older individuals; he noted an increase in muscle protein synthesis (anabolic effect) of omega-3 fatty acids in younger adults. He summarized by saying additional studies are needed to evaluate the effect of omega-3 fatty acids on muscle metabolism in human cancer.
Muscle wasting can occur due to a number of factors, such as cancer, aging, malnutrition, co-morbid conditions, inactivity, medications (for example, high doses of corticosteroids). Dr. Baracos discussed the following muscle building treatments to reverse muscle wasting:

- **physiology** (anabolic assistance through the use of testosterone, resistance training, insulin) and nutrition (nutrients essential for muscle building protein, amino acids, omega-3 fatty acids, creatine, vitamin D).
- **drugs** (anabolic steroids).

Gianni Biolo, M.D., Ph.D. University of Trieste, Italy, presented data on how to treat the obese patient with cachexia. He described a vicious cycle of sarcopenic obesity that is characterized by a systemic inflammatory response, insulin resistance, anabolic resistance to amino acids and protein, muscle atrophy, positive energy balance, increased fat deposition, and decreased physical activity. In a randomized controlled trial in non-dialyzed patients with chronic kidney disease, changes in muscle strength were significantly greater after 12 weeks in the resistance exercise training group (\(P = 0.001\)) compared to the control group.\(^{20,21}\)

Sarcopenia has been associated with increased risk for mortality with lower muscle mass associated with increased mortality risk. Body mass index does not reveal signs of muscle wasting. Therefore, measuring both muscle and fat can help in assessing for cancer cachexia. One method to do this is to look at computed tomography (CT) images of skeletal muscle at defined vertebral landmarks: e.g., the 3rd lumbar vertebra and the 4th thoracic vertebra.

In patients with metastatic breast cancer who were receiving capecitabine, sarcopenia was found to be a factor in dose-limiting toxicity and treatment interruptions (dose reductions or delays). A BMI < 25 and sarcopenia was associated with dose-limiting toxicity and treatment interruptions (dose reductions or delays). A BMI < 25 and sarcopenia was associated with dose-limiting toxicities in patients with renal cell carcinoma.\(^{16}\)

In patients with hepatocellular carcinoma treated with sorafenib, delays. A BMI < 25 and sarcopenia was associated with dose-limiting toxicity and treatment interruptions (dose reductions or delays). A BMI < 25 and sarcopenia was associated with dose-limiting toxicities in patients with renal cell carcinoma.\(^{16}\)

Anabolic resistance to amino acids can develop as a result of inactivity, aging, cancer, and acute and chronic diseases with systemic inflammation. To overcome anabolic resistance, protein requirement is increased. In addition, resistance exercise has been shown to enhance the anabolic efficiency of amino acids and protein.

In a randomized, controlled trial in non-dialyzed patients with chronic kidney disease, changes in muscle strength were significantly greater after 12 weeks in the resistance exercise training group (\(P = 0.001\)) compared to the control group.\(^{20,21}\)

Timing of protein supplementation has been found to be important for muscle protein synthesis. Muscle hypertrophy was greater in elderly individuals consuming protein immediately after resistance training compared to those who consumed protein 2 hours post exercise.\(^{25}\)

In a prospective, observational study of 2867 women diagnosed with stage I, II, or III breast cancer, physical activity in the form of walking about 3 to 5 hours per week was shown to reduce risk of death from the disease.\(^{26}\)

Dr. Biolo also discussed functional nutrients including a study of fish oil supplementation in elderly women participating in strength training.\(^{27}\) Muscle strength and functional capacity improved after 90 days in the women who received 2 g fish oil/day compared to the control group.

In summary, treatment of obese patients with cachexia should include exercise, energy balance, protein intake, and functional nutrients.

**Selected Clinical Evidence From Around the World**

Hiromitsu Takeyama, M.D., Ph.D., Nagoya City University Graduate School of Medical Sciences, Japan, presented results of his study on EPA and pancreatic cancer. The objective was to evaluate the effect of omega-3 fatty acid arachidonic acid (AA) and omega-3 fatty acid eicosapentaenoic acid (EPA) on growth of pancreatic cancer in vitro and in vivo.

In a COX-2 positive human pancreatic cancer BxPC-3, AA stimulated growth while EPA decreased growth.\(^{28}\) When prostaglandin E\(_2\) (PG\(_E_2\)) and PGE\(_2\) were exposed to the cell line, PG\(_E_2\) stimulated BxPC-3 growth, whereas PGE\(_2\) decreased cell growth. However, COX-2 inhibitor was shown to reverse the AA mediated increase in cancer cell growth. In contrast, EPA appears to affect both COX-2 dependent and COX-2 independent mechanisms in decreasing cell growth.

In an in vivo mouse study, tumor volume was lower in the animals fed fish oil compared to those fed corn oil. There was also a difference in PGE\(_2\) and PGE\(_2\) levels, with PGE\(_2\) not detected in the corn oil fed group. Apoptotic cells were increased in the fish oil group, correlating with decreased tumor growth. Dr. Takeyama concluded by stating that omega-3 fatty acids may be beneficial as monotherapy or in combination with standard chemotherapeutic agents in patients with pancreatic cancer.
Fifty-seven patients were included in the study. At baseline, 59.6% of patients were well nourished as assessed by SGA. The most frequent adverse events as measured by the Common Terminology Criteria for Adverse Events included anorexia (38.6%), lymphopenia (31.4%), dysgeusia (28.1%), taste disorders reported by the patients included bitter taste, no taste, unpleasant taste, and different taste. Trends were found in bitter perception threshold ($P = 0.051$) and in umami recognition threshold ($P = 0.058$). Patients who experienced high sweet perception threshold consumed less calories, proteins, and micronutrients than those with low sweet perception threshold. The presence and type of dysgeusia should be evaluated in patients as this can affect nutrient intake and nutritional status.

Dysgeusia (change in taste) is a common toxicity that can manifest as a:

- Distortion in taste
- Lack of taste (agnosia)
- Decreased sensitivity of perception (hypogeusia)
- Increased sensitivity to some or all flavors (hypergeusia)

The outcome of her study was to evaluate changes in perception and recognition thresholds of bitter, sweet, and umami tastes and their relationship with diet consumption in patients with advanced NSCLC. Seventy patients naïve to treatment were enrolled in this cohort study. Perception and recognition thresholds of bitter, sweet, and umami tastes were measured at baseline and after 2 cycles of chemotherapy (approximately 6 weeks). Tastes were presented in high concentrations to assess baseline and after 2 cycles of chemotherapy (approximately 6 weeks). Tastes were presented in high concentrations to assess hypergeusia and low concentrations to assess hypogeusia. A fifth basic taste described as savory with a pleasant aftertaste, called umami, is due to the monosodium L-glutamate (MSG) molecule. Umami is associated with the sense of umami, a fifth basic taste described as savory. It is also a common feature in many traditional foods, such as meat, fish, vegetables, and dairy products. Umami is a sensation, not a single taste, and it is often described as an enhancement of flavor. It is not a taste in the traditional sense, but rather a perception that enhances the overall flavor of food. The presence and type of dysgeusia should be evaluated in patients as this can affect nutrient intake and nutritional status.

**Summary**

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**Chikao Niki, M.D., Ph.D., Japan**, conducted a study to assess the effect of age-related changes in metabolic response to cancer surgery and oral nutritional supplement enriched with EPA and protein each day. The second patient was a 56-year-old woman who also developed stenosis. Parenteral nutrition and chemotherapy were also initiated. Because she was able to take liquids, but not food, she was also given 2 packs of an oral nutritional supplement enriched with EPA and protein to help patients to gradually consume food and wean off PN. Weight and albumin levels were maintained. With the help of chemotherapy, these 2 patients were able to consume an oral nutritional supplement enriched with EPA and protein, which enabled them to continue receiving treatment.

**3. Dr. Yoshihiro Tanaka from Japan** retrospectively evaluated the effect of an oral nutritional supplement enriched with EPA and protein on body weight loss and duration of chemotherapy in patients with recurrent stage IV esophageal cancer. Six patients with recurrent stage IV esophageal cancer were included in the standard diet and supplement group (Group A) and six were in the standard diet without supplement group (Group B). Patients in Group A experienced a positive change in weight (+0.25 ± 3.43 kg) while those in Group B had a negative change (-8.15 ± 3.38 kg; $P = 0.004$). Although not significant, there was a trend toward more months of receiving chemotherapy in Group A (mean duration 11 vs 8.6; $P = 0.314$).

**Posters**

Four of the submitted abstracts included studies conducted with an oral nutritional supplement enriched with EPA and protein. Findings from these studies are summarized below.

1. **Dr. Hiroshi Imamura from Japan** evaluated the effect of an oral nutritional supplement enriched with EPA and protein in patients with gastric cancer with a C-reactive protein (CRP) level > 0.5 mg/dL and an albumin level < 3.5 g/dL who were receiving primary chemotherapy. Nine of the 14 patients showed an improvement in CRP and 8 had an improvement in albumin.

2. **Dr. Masaaki Taniguchi from Japan** highlighted data on two patients with gastric cancer receiving chemotherapy who consumed an oral nutritional supplement enriched with EPA and protein. The first patient was a 60-year-old man who underwent surgery for gastric cancer. After surgery he developed stenosis of the stomach which affected his ability to eat or drink. Enteral feeding through a jejunostomy was given but failed due to severe diarrhea. Parenteral nutrition (PN) and chemotherapy were initiated. After 2 weeks of chemotherapy, the stenosis improved so that the patient could begin to take liquids. He was advised to consume 2 packs of an oral nutritional supplement enriched with EPA and protein each day. The second patient was a 56-year-old woman who also developed stenosis. Parenteral nutrition and chemotherapy were also initiated. Because she was able to take liquids, but not food, she was also given 2 packs of an oral nutritional supplement enriched with EPA and protein to help patients to gradually consume food and wean off PN. Weight and albumin levels were maintained. With the help of chemotherapy, these 2 patients were able to consume an oral nutritional supplement enriched with EPA and protein, which enabled them to continue receiving treatment.

**Maria Isabel Correia, M.D., Ph.D., Federal University of Minas Gerais, Brazil**, gave the oral presentation for her student, **Silvia Fernandes Maurício**, (who was not in attendance). Ms Maurício looked at the relationship between nutrition assessment using SGA and Glasgow Prognostic Score (GPS) in patients with GI cancer. Glasgow Prognostic Score is an inflammation-based prognostic score. Gastrointestinal cancer patients who had not received chemotherapy were enrolled. Mortality was evaluated based on the National Cancer Institute Common Toxicity Criteria. Weight loss of >10% was found in 49.9% of the patients. Over 54% of the patients were severely malnourished based on SGA. When GPS was aligned with SGA, 100% of the patients with a GPS score of 2 were in the SGA C category (severely malnourished). Patients in SGA C category and with a GPS score of 1 or 2 had more complications. These results suggest that as the prevalence of malnutrition increases, so does the mortality. In her conclusion, Ms Maurício stated that in outpatient oncology clinics GPS should be used as a screening and predictive tool.
Early Nutritional Support During Chemotherapy and Radiotherapy

Jann Arends, M.D., Tumor Biology Center at Freiburg University, Germany, described the use of multimodal management of nutritional problems during oncological therapy. Many patients have lost weight before a cancer diagnosis, with weight loss continuing after diagnosis. Patients with pancreatic cancer without cachexia survive significantly longer than those with cachexia (P < 0.001). Practically, the approach to treatment should be simple: curative treatment, palliative oncological treatment, and/or supportive care. A vicious cycle exists in cancer patients between reduced oral intake, decreased physical activity, and inflammation. All of these factors have an effect on body weight and muscle mass. Therefore, treatment should be multimodal that includes, in addition to anti-cancer therapy, nutrition to increase energy and protein intake, muscle training, and anti-inflammatory drugs. Use of non-steroidal anti-inflammatory drugs has been shown to prolong survival in weight losing cancer patients (\textit{P} < 0.03). A number of evidence-based guidelines are available that provide guidance on nutritional care in head and neck cancer patients, patients with cancer cachexia, patients receiving radiotherapy and chemotherapy, and patients requiring enteral or parenteral nutrition support. Recommendations are graded based on level of evidence, with randomized, controlled trials being the gold standard for highest level of evidence. Dr. Isenring is the chair of the committee that is updating evidence-based practice guidelines for the nutritional management of radiotherapy. The goal of the update is to include chemotherapy and combine the guidelines with the evidence-based practice guidelines for the nutritional management of adult patients with head and neck cancer in order to create a new set of oncology guidelines. Clinical questions that were evaluated included appropriate access to care, nutrition intervention, and nutrition monitoring and evaluation. A literature search found 5 randomized, controlled trials in chemotherapy. This suggests that the data is not as strong for nutrition intervention in chemotherapy and more studies are needed to establish a recommendation.

Elisabeth Isenring, Ph.D., AdvAPD, Queensland University of Technology, Australia, discussed the use of conventional nutrition therapy during radiotherapy and chemotherapy. Patients can experience side effects from the tumor or from cancer treatment. Side effects of cancer treatment have many recognized nutritional symptoms (e.g., nausea, vomiting, diarrhea, dysphagia, loss of appetite). A number of evidence-based guidelines are available that provide guidance on nutritional care in head and neck cancer patients, patients with cancer cachexia, patients receiving radiotherapy and chemotherapy, and patients requiring enteral or parenteral nutrition support. Recommendations are graded based on level of evidence, with randomized, controlled trials being the gold standard for highest level of evidence. Dr. Isenring is the chair of the committee that is updating evidence-based practice guidelines for the nutritional management of radiotherapy. The goal of the update is to include chemotherapy and combine the guidelines with the evidence-based practice guidelines for the nutritional management of adult patients with head and neck cancer in order to create a new set of oncology guidelines. Clinical questions that were evaluated included appropriate access to care, nutrition intervention, and nutrition monitoring and evaluation. A literature search found 5 randomized, controlled trials in chemotherapy. This suggests that the data is not as strong for nutrition intervention in chemotherapy and more studies are needed to establish a recommendation.

Dr. Mazurak conducted an open-label study in patients with NSCLC receiving 1st line chemotherapy to assess the effect of fish-oil supplementation on weight loss, skeletal muscle, tumor response, and side effects. Body composition was measured using diagnostic CT images. People in the fish oil group were able to maintain weight and muscle while losing intermuscular adipose tissue. Fish oil was found to improve response rate (60% in fish oil vs. 26% in standard of care, \textit{P} < 0.008) and clinical benefit to chemotherapy (60% in fish oil vs. 45% in standard of care, \textit{P} = 0.02). Patients in the fish oil group received more chemotherapy. No difference in toxicity was found between the groups. Although not statistically significant possibly due to the small sample size, there was a trend towards improved one-year survival in the fish oil group. Dr. Mazurak concluded by recommending that interventions should be implemented before patients become cachexic. Providing a choice of supplement format (capsules or liquid) may increase compliance, which was 95% in her study.

Vera C Mazurak, Ph.D., University of Alberta, Canada, discussed fish oil supplementation during chemotherapy. Earlier studies have demonstrated that fish oil supplementation may attenuate muscle and adipose tissue wasting.

Lung cancer is the leading cause of death worldwide. Over 75% of lung cancer diagnoses are made at an advanced stage. Malnutrition is common in these patients, particularly muscle and adipose tissue wasting.

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Jorge Contreras Martinez, M.D., Ph.D., University of Malaga, Spain, gave a presentation on nutrition intervention during radiotherapy. The goal of radiotherapy (RT) is to provide the maximum dose to kill the cancer cells while producing minimum toxicities. A number of nutritional problems can develop as a result of radiotherapy including anorexia, difficulty swallowing, altered sense of smell, taste changes, mucositis, xerostomia, weight loss, nausea, vomiting, constipation, and diarrhea. These nutritional problems can cause a decrease in tolerance and effect of radiotherapy and reduce quality of life. Dr. Contreras described a number of objectives of nutritional intervention during radiotherapy:

- To prevent and treat malnutrition
- To reduce the toxicity of radiotherapy
- To improve the effect of the treatment
- To improve QoL.

Dr. Contreras discussed a prospective non-randomized comparative study of prophylactic gastrostomy (PEG) versus no PEG in 58 patients with stage II and IV head and neck cancer receiving radiotherapy. Weight loss was less in the PEG group at 4 weeks and 8 weeks. Quality of life was higher at week 1 in patients with PEG compared to those without PEG, and remained higher at both week 4 and 8 in the patients with PEG. He concluded by stating: “We can obtain better results in terms of local control and survival with RT by doing a nutritional intervention.”

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Nutrition-Related Assessment and Outcomes during Cancer Treatment

Marie Fallon, M.D., University of Edinburgh, Scotland, discussed how to screen patients for entry into clinical trials. Patients may be experiencing symptoms other than the index symptom(s) being measured in the trial. These confounding symptoms should be stable before patients enter a trial to avoid compromising the trial results. In screening patients for study eligibility, one needs to consider prognosis, physical symptoms, psychological symptoms, family or caregiver support, and family anxieties.

A typical clinical scenario is uncontrolled pain, which can lead to poor appetite and weight loss. Analgesia for pain can also cause nutritional problems, e.g., constipation, nausea, and vomiting. Depression is also common in cancer patients, which if not treated, can contribute to significant weight loss.

Professor Fallon presented a case study of a 72-year-old man with advanced NSCLC who was evaluated for participation in a cachexia study. He was experiencing pain due to a right Pancoast tumor that had not been relieved by palliative radiotherapy, weight loss of 15%, poor appetite, and inability to sleep due to the pain. After 2 weeks of pain medication (duloxetine), his pain, appetite, sleep, and mobility improved.

Professor Fallon summarized by saying that timing is important. All symptom studies should include standard best supportive background care: otherwise what one thinks they are measuring in a trial may be different from what they are actually measuring. Vickie Baracos, Ph.D., discussed what clinicians need to assess. There are now published definitions and classifications for cancer cachexia and adult starvation and disease-related malnutrition. 1 She described the consensus process used by the international expert panel to achieve the statements used to define and classify cancer cachexia. Cachexia is disease-associated malnutrition. Examples of conditions associated with each domain include:

- weight loss, muscle wasting, sarcopenia
- nutrition-related symptoms-nausea, dysphagia, anorexia
- inflammation, tumor burden, insulin resistance
- quality of life, physical function, survival, treatment outcomes

Domains of the conceptual framework are found in nutrition assessment tools, for example the Patient-Generated Subjective Global Assessment (PGSSA) and Mini-Nutritional Assessment (MNA). She cautioned, however, that because the criteria and scoring systems of the different assessment tools vary, malnutrition may not be uniformly diagnosed.

Dr. Baracos looked at the question of whether these concepts are applied in nutritional assessment in research and practice. In a review of the literature from 2005-2011, 209 studies on nutrition in head and neck cancer patients were reviewed. Twelve studies, defined and assessed malnutrition based on 5-7 criteria, while 96 studies used 2-4 criteria. Surprisingly, 101 studies used only one criterion to define malnutrition (10% weight loss or BMI <18.5, low albumin, presence of dysphagia). Dr. Baracos feels we need more consensus processes to define nutrition screening and assessment plans. She listed the following online resources to help monitor patients:

- BMI calculator: http://www.nhsbsupport.com/bmi/
- Weight loss calculator: http://www.fitwatch.com/pkcalc2/

Dr. Baracos concluded by discussing the use of CT or magnetic resonance imaging (MRI) images as a way for clinicians to monitor nutritional status based on:

- skeletal muscle wasting
- altered distribution of body fat
- accumulation of visceral adipose tissue
- pathological accumulation of lipids in tissues (i.e., hepatosteatosis, myosteatosis)

These images are readily available for most cancer patients and provide a way to monitor changes over time.

In conclusion, Dr. von Haehling stated that cardiovascular interventions may help to improve the QoL of patients with cancer and potentially also their survival.

Eduardo Ferroni, M.D., Ph.D., University of São Paulo, Brazil, discussed physical activity as a patient-focused endpoint. A number of intervention endpoints can be evaluated, for example, changes in body composition, decrease in inflammation, increase in function or performance status, decrease in pain. Is physical activity one of them?

Physical activity can be measured using accelerometers and pedometers. However, the accelerometers do not discriminate activity and pedometers do not discriminate time. Newer generations of equipment can now discriminate both activities and time.

Dr. Ferroni conducted a study to look at how daily physical activity is affected by disease state and treatment and the correlation between physical activity, QoL, and performance status. He enrolled 162 patients that included those who had undergone curative surgery and some who were receiving palliative chemotherapy and radiotherapy. Performance status was evaluated based on World Health Organization/Eastern Cooperative Oncology Group (WHO/ECOG) and Karnofsky Performance Status scores. Quality of life was measured using the EORTC QLQ-C30. Physical activity was measured by the ActiPAL system. Results show similar activity levels between the healthy controls and early diagnosed cancer patients; however, patients with advanced cancer spent more time sitting/lying. Patients receiving palliative and adjuvant chemotherapy spent more time sitting/lying than the healthy controls. In addition, surgery for upper GI cancer also affected the time spent sitting/lying 1 week after surgery and up to 3 months after with a decrease in time noted 6 months after surgery to a level similar to pre-surgery. Patients receiving palliative and adjuvant chemotherapy spent more time sitting/lying than the healthy controls. In addition, surgery for upper GI cancer also affected the time spent sitting/lying 1 week after surgery and up to 3 months after with a decrease in time noted 6 months after surgery to a level similar to pre-surgery. Patients with an EOG score of 2 were found to spend >20 hours sitting/lying.

In conclusion, Dr. Ferroni stated that measuring physical activity is relatively inexpensive and can provide an objective and meaningful estimate of patient function as well as a surrogate for quality of life.
Future of Multimodal Therapy and Cancer Cachexia

Stein Kaasa, M.D., Ph.D., Norwegian University of Science and Technology, Trondheim, Norway, discussed the future of multimodal therapy by describing the MENAC (Multimodal Exercise/Nutrition/Anti-Inflammatory treatment for Cachexia) Trial. This trial is being run by the European Palliative Care Research Centre. Currently there is no consensus on how to treat patients with cachexia. So where does one start? With weight loss, inflammation, anorexia, reduced physical function? Or should we look at clinical biomarkers?

Nutrition alone is not enough. A multimodal treatment approach is necessary to deal with the complex pathophysiology. In the MENAC trial, treatment will include a combination of:

- Oral nutritional supplements containing EPA (2 cartons/day for 6 weeks) and nutrition information and dietary advice
- Home-based self-assisted physical exercise program that includes daily walking and resistance exercises performed 3 times/week
- Anti-inflammatory treatment with celecoxib

Patients in the control group will receive standard cancer care treatment.

Currently, a phase II feasibility study is being conducted with 40 patients. A phase III randomised multicentre study will follow completion of the feasibility study. The primary objective of the feasibility study is to evaluate compliance with study intervention and study procedures and to assess for any contamination in the control group with interventions in the treatment group. Patients will be enrolled who have advanced NSCLC (stage III-V) or non-operative pancreatic cancer and are scheduled to begin chemo- or chemoradiotherapy. Three centers are currently participating in the feasibility study. Dr. Kaasa invited others to join.

In his closing remarks Professor Fearon commented that “Nutritional support is not a hobby, but a professional activity.” Nutrition is a core component of supportive oncology. Nutritional support should be provided at a high level to reduce complications and achieve full support.

References

References continued


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