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Cancer in geriatrics

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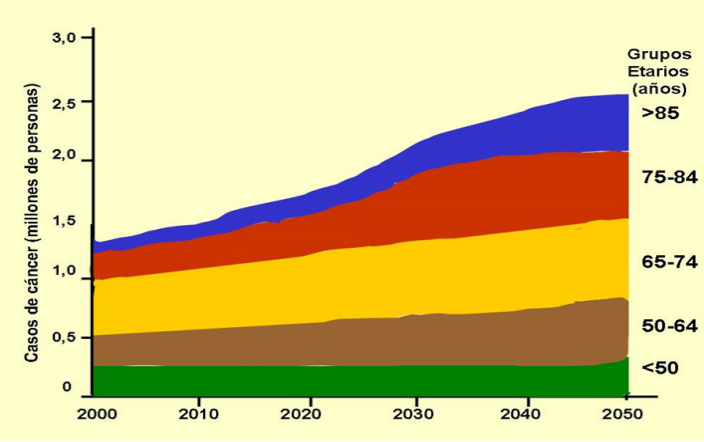
Introduction

Cancer is today the leading cause of death in the West and is a problem that is constantly increasing in old age, mainly due to the higher average life expectancy in first world countries and to a lesser extent in others. In the development of cancer in the elderly, the degree of tumor growth, the greater susceptibility of tissues to environmental carcinogens and the changes in the body that favor the formation and progression of cancer must be taken into account.

We will treat the epidemiological, molecular and physiological characteristics of neoplasms in the individual over 65 years of age. Aspects of prevention are pointed out and the techniques for evaluating the cancer patient are described to carry out a therapeutic approach adapted to each individual.

epidemiology

The average age for cancer diagnosis in developed countries is approaching 70 years and more and more people are affected, because this segment of the population is the fastest growing. Projections in the United States indicate that by 2030 70% of neoplasms will occur in people 65 years of age or older [1]. (Fig. 1).



The elderly constitute a special group in relation to cancer because the highest incidence of neoplasms falls on them, so much so that the elderly 65-year-olds make up only 13% of the population, but bear 60% of malignancies and nearly 70% of all cancer deaths. (Hodgson NA, 2002). Fig. 2 shows the percentage of different types of cancer in people over 65 for both sexes in the Argentine Republic.

All types of cancer increase as the years go by, but they do not do so in a homogeneous way and there are also variations related to sex. Thus, in men, prostate cancer is the one that increases the most in frequency from 65 years to 85 years, going from 100 per 100,000 to 700 per 100,000 men, respectively, while other tumors do so in a certain way. more staggered. In women, the cancer that increases the most in frequency from 65 to 85 years is that of the colon and rectum, going from 80 per 100,000 to 300 per 100,000, respectively [1].

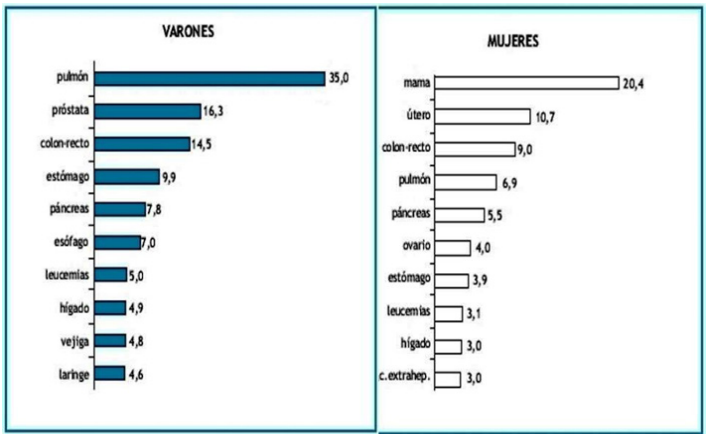


Figure 2: Incidence of the different types of neoplasms in men and women over 65 years of age in the Argentine Republic.

Factors inherent to age that affect the prognosis and evolution of neoplasms

Associated pathologies It is important to note that patients over 65 years of age present a series of associated pathologies that contribute to increased mortality from cancer. Table 1 indicates the most common associated morbidities in the elderly (Yancik R, et al, 2016).

Table 1: More common underlying diseases in individuals 65 years of age than morbidity and mortality in cancer patients

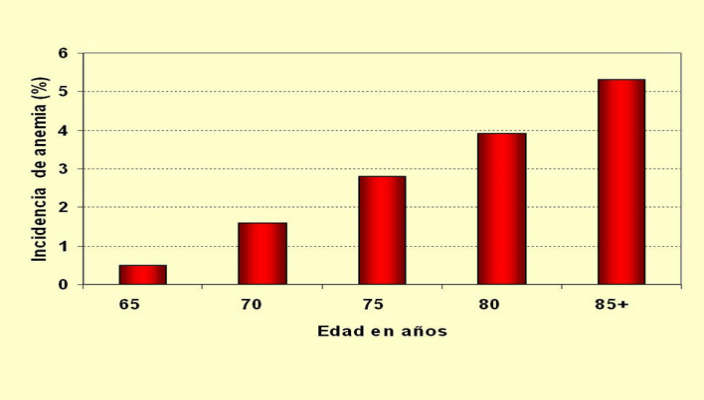
Pathology	%
Hypertension	42,9
Cardiac pathology	39,1
Arthritis	34,9
Digestive pathology	31
Anaemia Pathology	22,6
Eye pathology	19
Urinary pathology	18
previous tumor	15,4
Cholecystopathies	14,9
EPOC	14,5

Of all these associated pathologies, anemia deserves to be highlighted, since in recent years studies have shown that it is related to lower survival, greater functional dependence, dyspnea, and an increased risk of therapeutic complications [2,3].

There is normally a tendency towards anemia during aging, even in healthy people (Fig. 3) [4]. This is not due to a decline in pluripotent stem cells, since they do not seem to be affected in quantity over time (Balducci L, et al, 2016). The currently most accepted hypothesis is that aging is associated with an increase in cytokines, particularly interleukin-6 (IL-6), which affect the response of hematopoietic stem cells to growth factors [4].

Other causes of anemia in the elderly are associated pathologies, particularly chronic kidney failure and a deficit of vitamin B12 supply. In general, many elderly people do not eat well, due to loss of teeth and also due to financial deficiencies. All these mechanisms are independent of aplastic anemia, which is an autoimmune process associated with inhibition of the maturation and proliferation of hematopoietic cells.

In the elderly with cancer, suppression of bone marrow activity by chemotherapy or radiotherapy is also added. The treatment of anemia will be focused in the chapter of treatment and management of the elderly with cancer.



Molecular changes due to aging

" In vitro " cellular aging is associated with molecular changes, some of which may be favorable and others not, such as mutations, hypermethylation of DNA and the formation of DNA adducts. An adduct is a complex that forms when a chemical compound binds to a biological molecule, such as DNA or proteins (Careca I, et al. 2015).

These molecular changes are common in cellular aging and resemble the molecular changes of carcinogenesis, leading to the activation of oncogenes and the suppression of antiproliferative or antioncogene genes. In this way, aging cells are more susceptible than young cells to the late-phase effects of carcinogens (promoters).

The changes that oppose carcinogenesis are the progressive reduction of telomere length and telomerase activity, as well as the activation of the P14 gene that encodes a cyclin-dependent kinase inhibitor and therefore opposes to cell proliferation (Collins K, 2019; Liggett WH, et al. 2019).

The telomere is located at the ends of the chromosome which it protects from degradation. Prior to cell division, the cell duplicates its DNA, including the sequence of bases that make up the telomere. However, in a normal cell, the replication machinery is unable to copy the entire telomere sequence on one of the DNA strands of the chromosome, and as a result, the telomere becomes shorter and shorter with each replication. The wear of the telomere with the succession of cell cycles prevents its protective function, so the chromosome becomes unstable, causing errors in division that lead to the appearance of various types of mutations. The cells that present these defects are not only incapable of duplicating, but they are no longer viable, activating the processes of apoptosis or programmed cell death. Telomere wear limits the duration of the cell life cycle of most cell types, except germ and embryonic cells, which possess the telomerase enzyme capable of restoring the telomere sequence [5]. Telomere dysfunction, including shortening of its length or structural changes, has been shown to contribute to cancer and aging. In the elderly, telomere and telomerase function is altered (Sharpless NE, et al, 2004). More than 80% of all cancers have been found to have increased telomerase activity. This is due to several mechanisms, including increased expression of human telomerase reverse transcriptase (hTERT) that increases telomerase activity. Another mechanism is the reduction of TRF2, which is a DNA binding protein in specific sequences and that protects telomeres (Gu J, 2015).

Aging also produces lower expression of the p53 gene that normally regulates the cell cycle and protects its genome. When the availability of p53 is limited, multiple mutations occur that predispose to cancer (Sharpless NE, et al, 2012).

Importance of inflammatory processes in old age

The inflammatory phenomenon participates in many aspects of aging, in fact, aging is associated with a certain degree of inflammatory activity that leads to tissue damage over time [6].

The relationship between the mechanism of carcinogenesis and inflammation has been noted for several decades. Tumors have an

inflammatory microenvironment characterized by the presence of leukocytes both in the stroma surrounding the tumor and in the tumor area (Lakwill F, et al, 2011). Inflammatory cells and cytokines found in tumors contribute to tumor growth and immunosuppression, allowing for an effective antitumor response by the host. However, cancer susceptibility, which is increased in old age, could be associated with polymorphisms of cytokine genes, especially those of IL-6. Cytokines are proteins secreted mainly by cells of the immune system and alter the behavior of the cell that produces it or that of another cell. The cytokines whose polymorphism appears to be related to tumorigenesis are IL-10 and IL-6. As cytokines generally exert various types of stimuli, the interrelation between these molecules and cancer is variable. In the case of IL-10, it was observed that high values of this protein are tumor promoters and are usually elevated in various types of solid tumors (Dummer W, et al, 2015). On the other hand, IL-10 blocks the ability of monocytes / macrophages and dendritic cells to act as antigen presenting cells. Therefore, the main function of IL-10 would be to limit and terminate the inflammatory signal. This phenomenon would cause the "killer" cells to lysis and control the tumor. However, the results of research on tumor genetic mechanisms, in which infectious agents are involved, showed that a high production of the IL-10 genotype would be detrimental, while it can be favorable against solid tumors such as breast and breast tumors. the prostate (Calogero C, et al, 2014).

It is known that, at the beginning of an inflammation, IL-6 acts as a mediator of the acute phase. If IL-6 activity persists, acute inflammation becomes chronic and cytokine maintains the survival and growth of lymphocytes and myeloid cells, which in turn increase IL-6 levels, thus creating a vicious circle (Ishihara K, et al, 2012). Experimental studies suggest that IL-6 acts as a potent metastasis stimulator through increased expression of adhesion molecules by endothelial cells and by production of vascular endothelial growth factor (VEGF). Elevated IL-6 levels are associated with advanced stages and poor prognoses in various types of cancer, including breast and colon and rectal cancer (Belluco C, et al, 2013).

DNA damage by free radicals

The generation of free radicals or reactive oxygen species (ROS) is a consequence of aerobic cellular metabolism. When ROS production in a tissue exceeds the antioxidant defenses, a situation of oxidative stress is created that affects the genetic material. Due to the fact that several conditions that are strong generators of ROS are also carcinogenic (smoking, xenobiotics, chronic inflammations, UV radiation), many lines of research support the hypothesis of ROS as promoters of cancer (Valko M, et al, 2014).

The permanent modification of the genetic material by the action of ROS represents the first step in carcinogenesis related to mutagenesis and aging (Halliwell B, et al, 2019). The DNA alterations caused by ROS are eliminated by various repair mechanisms, most of which are effected by excision or cutting of the affected segment. However, incomplete or defective DNA repair can lead to mutations such as base deletion or substitution leading to carcinogenesis. This mutagenic potential is directly proportional to the number of oxidized DNA bases that escape repair processes, which decay over the years (Marnett LJ, 2020).

Two mechanisms involved in ROS carcinogenesis are considered. The first mechanism is by modulating the expression of genes that activate growth and proliferation signals that lead to tumor promotion. Tumor suppressor genes such as p53 can also be affected (Szymanska K, et al, 2013).

In the second mechanism ROS induce various chromosomal alterations that block DNA replication and increase cytotoxicity (Valko M, et al, 2004). ROS can act by directly oxidizing DNA bases or indirectly through biomolecules oxidized by ROS themselves, such as lipoperoxides and malondialdehyde, both products of the oxidation of fatty acids in cell membranes and lipoproteins (Tang DG , et al, 2002).There are numerous methods to evaluate oxidative damage to DNA, one of the most popular is the oxidation of guanine base (8-oxoG) and it is considered a marker of carcinogenesis [8].

Different behaviors of some tumors in the elderly

The biological characteristics of some tumors change with age, an aspect that is detailed in table 2 where it is observed that some tumors are more aggressive in the elderly than in younger people.

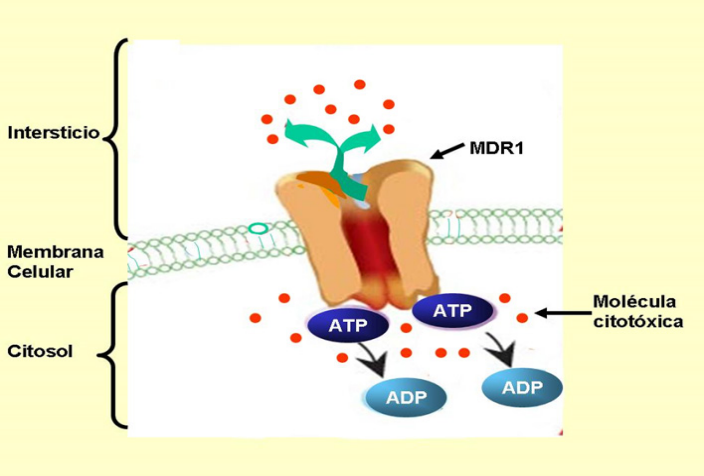
Table 2: Biological modification of some age-related neoplasms

Neoplasia	Modification	Mechanism
Acute myeloid Leukemia	Increased resistance to chemotherapy	Increased cellular expression of MDR1 and cytogenetic changes
Lymphoma	Less response to chemotherapy. shorter duration of response and shorter survival	Increase of IL-6 in the circulation that produces greater proliferation of lymphocytes. immune impairment and increased growth of highly immunogenic tumors
Breast cancer	Sensitive hands	Tumors have greater cancers of well differentiated cells rich in hormone receptors and a lower fraction of tumor growth. Aging of the immolation system
Non-small cell lung cancer	Sensitive hands	Cancer development in former Anacin smokers
Ovarian cancer	Decreased response to chemo-therapy minor survival	Unknown

where it is observed that some tumors are more aggressive in the elderly than in younger people.

The phenomenon of resistance to tumors against different agents constitutes a formidable challenge in the field of oncology. This resistance can be seen at diagnosis or can be acquired after treatment followed by tumor recurrence. Although the mechanisms that produce resistance to antineoplastic drugs are multiple, the most important would be given by a glycoprotein designated as MDR1. This molecule is a membrane channel that actively expels, that is,

with consumption of ATP, the cytotoxic agent from the cytoplasm into the interstitial space (Fig. 4). MDR1 activity stands out particularly in acute myeloid leukemia and its expression is increased in the elderly (Mori M, 2011). An important area of cancer research is aimed at standardizing methods for dosing MDR1 and using it as a therapeutic target.



The other aspect is that the influence of aging on carcinogenesis may be due to the tumor cell itself or to the microenvironment in which it resides. Experiments with rodents showed that implantation of the same strains of lung carcinoma or melanoma produced faster growth, a greater number of metastases and a lower survival rate in young rats than in old women. Conversely, the implantation of tumors of higher immunogenic capacity, such as radiation-induced sarcomas, was better tolerated in young rats than in elderly rats [9].

Another tumor whose behavior varies according to age is breast cancer and, like the previously mentioned tumors, the difference according to age is due to the immune response. In elderly women, less infiltration of lymphocytes was observed in the biopsies obtained, which indicates a reduced immune response against the tumor, in younger women, on the contrary, the immune response was greater and this makes the tumor progress due to f of angiogenic factors secreted by immune cells (Hadar, EJ, et al. 2018). Similar results were found by Veronesi et al, (Veronesi U. et al, 2001) who observed that 4 years after a partial mastectomy, without postoperative radiotherapy, the local recurrence rate in women under 55 years of age was 18%, while in women above that age, local recurrence was only 3%.

Another variation in the evolution of tumors in relation to age was observed in lung cancer, where in the last 20 years the mortality rate fell in people under 60 years of age in relation to people over 70 years (Weir HK, et al, 2003). This phenomenon could be explained, at least partially, by greater smoking cessation in new generations, which delays the appearance of lung cancer, a phenomenon that would also be associated with a more favorable histology.

Cancer prevention in the elderly

Primary prevention

Primary prevention of cancer includes the elimination of environmental carcinogens. Older people, being more vulnerable to these carcinogens, are also more susceptible to responding to these measures than younger people [4]. The epidemiological changes observed in lung cancer where the incidence increases in elderly former smokers constitute a very important target for preventive action.

Another aspect of primary prevention is the use of agents that prevent certain types of cancer. These drugs are used for other conditions such as osteoporosis (tamoxifen), prostatic hyperplasia (finasteride), acne (retinoic acid), and pain and inflammatory processes (non-steroidal anti-inflammatory drugs). However, these drugs present side effects of sufficient magnitude that their use is not indicated exclusively for the prevention of cancer. As there is often abuse by physicians in the indication of these agents, this aspect is detailed in

Table 3: agents that prevent certain types of cancer their respective collateral effectors

Agent	Prevention	Side effect
MRSE (tamoxifen raloxifeno)	Reduce an 50% (tamoxifen) And in 70% (raloxifeno) Get breast cancer recurrence	Venous thrombosis, stroke, endometrial cancer. do not reduce cancer-related morality
finasteride	Reduce an 50% the incidence of prostate cancer	Increases the incidence of little differentiated prostate cancer
Retinoic acid	Delay the appearance of a new lung cancer	Epistaxis, dermatitis, colitis
coxibs	Reduce colon and rectal cancer mortality	They increase the risk of heart disease and stroke

MRSE: modulators of selective estrogen receptors; CVA: cerebrovascular accident; coxibs: selective cyclooxygenase 2 inhibitors.

Experiences with antioxidants. Due to a strong presence of the oxidative hypothesis of cancer, it was speculated that supplementing the diet with antioxidants could reduce the incidence of some types of tumors. Controlled studies gave poor results and in the case of beta-carotene they were directly unfavorable, at least in smokers (Hennekens CH, et al, 1996).

More promising results were observed with the administration of selenium, a trace element that is part of the active nucleus of the antioxidant enzyme glutathione peroxidase [10]. In 1996, the results of the National Prevention of Cancer Study (Clark LC, et al, 1996) were published, a study that enrolled 1,250 people from various centers in the eastern United States considered to be a selenium-poor area. The first objective of this study was to establish if supplementation with selenium (200 microg / day) compared to placebo, reduced the recurrence of skin cancer in individuals at high risk for this pathology. This objective was not met, however,

after 4.5 years of treatment and 6.5 years of follow-up, the results of the study showed that the patients randomized to the selenium group had a significant reduction (63%) of cancer of the prostate versus placebo. In fact, the group that received selenium experienced a lower incidence for both localized and advanced cancer. But the study also showed that men with low initial selenium levels, who were given this trace mineral, benefited the most in terms of prostate cancer reduction.

Using the same population from the National Prevention of Cancer Study as a ethodological basis, it was observed after 10 years of follow-up that selenium supplementation significantly reduced the incidence of lung cancer in participants who were in the lowest tertile. of plasma selenium values compared to controls ($p = 0.04$). (Reid ME, et al, 2012).

Secondary prevention

To date, secondary prevention remains the ideal method to curb the incidence of cancer in the elderly. This approach consists of periodically examining the asymptomatic individual at risk of cancer in order to make an early detection of the tumor. Such an approach is supported by the evidence that cancer can be detected at a preclinical stage and that treatment at this stage works best [9].

When conducting studies for the early diagnosis of cancer in elderly people, life expectancy and the usefulness of a certain study must be taken into account according to the age of the patient.

The life expectancy. The studies would be recommended in people whose life expectancy exceeds five years, since the benefits of the treatment are appreciated after the five years of the initial study. In disabled patients, with more than one geriatric syndrome or serious associated pathologies, studies for the early diagnosis of cancer are not justified (Walter LC, et al, 2011).

Age of the patient. In certain situations the study for the early diagnosis of cancer would not be recommended. For example, mammography for the early detection of breast cancer in women older than 69 years is less cost-effective than in younger women (Kerlikowske K, et al, 2018).

Secondary prevention of some types of tumors
Breast cancer In women between the ages of 50 and 70, having 4 to 6 mammograms reduced cancer-related mortality by 30% (Kerlikowske K, et al, 2020). Over the age of 70, there is controversy about the usefulness of mammography.

Cancer of the large intestine. Serial fecal occult blood tests reduced colon and rectal cancer mortality in people over 50 years of age [11]. It was also observed that a colonoscopy performed every ten years constitutes a cost-effective strategy to reduce mortality from this type of cancer. (Frazier AL, 2020). Colonoscopy and occult blood studies should not be denied to patients over 80 years of age with more than five years of life expectancy, because it is at this stage where large bowel cancer occurs most frequently and because elective surgery, As will be seen later, mortality does not increase with age.

Prostate cancer. Up to the age of 75, the study of markers such as prostate specific antigen has proven to be cost-effective. Above that age there is controversy about its indication (Schoder FH, et al, 2000).

Comprehensive evaluation of the cancer patient

Considering that aging is a highly individualized process, the International Society for Geriatric Oncology established a multidisciplinary task force to assess the many problems of the elderly with cancer, catalog their resources and energy, and the need for care. Thus, the "Comprehensive Cancer Patient Assessment" (EIPC [CGA: Comprehensive Geriatric Assessment]) was published [9].

In order to prepare the EIPC, several aspects had to be raised, which are discussed below.

Clinical evidence that allows stratifying risk groups in the elderly with cancer

One of the objectives of the EIPC was to establish clinical or biological markers that allow predicting the degree of decline, frailty and mortality of the elderly with cancer. To this end, the EIPC task force evaluated epidemiological and clinical studies, observing that in general clinical markers are more informative than biological ones.

Clinical markers: Functional decline is considered a good prognostic factor for early mortality and for this, evaluations have been generated that establish a functional decline score. These evaluations are based on an individual's ability to perform various daily activities (Rockwood K, et al, 1999).

Certain pathologies such as diabetes mellitus, hypertension, coronary heart disease, cerebrovascular insufficiency and osteoporosis, together with addictions such as smoking, are associated with a worse evolution in the elderly with cancer (Rockwood K, et al, 1999). Scoring scales have been developed that include various geriatric parameters, such as male gender, functional decline assessment score, congestive heart failure, unexplained weight loss, a blood creatinine value> 3 mg / dL, and hypoalbuminemia. . (Walter LC, et al, 2001). These parameters give an overall risk that ranges from 13% mortality per year at the lowest score to 68% at the highest score. Other similar rating scales have also been published (Desai MM, et al, 2002).

Accumulated experience indicates that the application of the EIPC is useful in geriatric oncology. A pilot study in elderly women with breast carcinoma showed that EIPC detected in patients various problems that had gone unnoticed, which allowed a better interaction with cancer treatment [9]. Based on these observations, the oncologist must be aware that if he does not apply a systematic evaluation method such as the EIPC, he may lose useful information on the patient's health status and this may negatively impact oncological treatment.

Cancer treatment in the elderly

To decide the treatment to be administered to the elderly patient, life expectancy and tolerance to the treatment must be considered; for this, the application of the previously mentioned measures is very useful. Antineoplastic treatment includes surgery, radiation therapy, cytotoxic chemotherapy, targeted molecular therapy, hor-

mone therapy, and biological therapy.

Surgery Surgical morbidity and mortality increases after the age of 70, but this is especially observed in emergency surgery and within this, in surgery for abdominal tumors. In elective surgery, the increased risk due to age is minimal. The quality of anesthesia constitutes an important advance, as well as the possibility of applying alternative procedures to surgery, such as radiofrequency ablation of the tumor. (Careca I, et al, 2005).

Recent studies indicate that large operations, such as cancer of the liver, bile ducts and pancreas, can be performed in individuals older than 70 years, without significantly increasing morbidity and mortality when it comes to elective procedures (Petrowsky H, et al, 2005).

Even surgery for the resection of lung carcinoma, considered high risk in the elderly, can be carried out with low morbidity and mortality when electively scheduled. Matsuoka et al, operated on 40 patients aged 80 and over for non-small cell lung carcinoma, with complete tumor resection (Matsuoka et al, 2005). The operations performed were: 40% lobectomies, 30% segmentectomies, and 30% wedge resections, with no surgical mortality despite the fact that 20% of the patients had serious associated pathologies. The survival rate was 92% at 1 year and 57% at 5 years. The experience of this and other authors indicates that age as an isolated element is not a risk factor in oncological surgery, but rather serious associated pathologies and emergency surgery are the determining factors in postoperative morbidity and mortality (Marusch F , et al, 2005).

Radiotherapy

According to retrospective studies on large series of patients, targeted external radiation therapy is well tolerated, even in patients older than 80 years, and around 90% manage to complete treatment (Balducci L, et al, 2004). Nutritional intake is important in patients receiving radiotherapy of the thoracic or upper respiratory tract and when there is a great risk of obstruction at the level of the esophagus, some type of gastrostomy may be necessary. In the treatment of prostate cancer, brachytherapy or placing radioactive seeds in the prostate gland is a safe and effective procedure (Zachariah B, et al, 2000).

Special Considerations for the Elderly Patient Receiving Cytotoxic Chemotherapy

In the elderly there is usually a certain degree of deterioration of the tissues responsible for absorbing, metabolizing and excreting cancer drugs. Furthermore, collateral damage to chemotherapy-sensitive tissues is greater in the elderly than in young adults. There are alterations in liver absorption and metabolism that decrease or increase the effectiveness of a drug. An important factor to take into account is the progressive reduction in the renal glomerular filtration rate, which is almost constant in aging and this can increase the half-life of some agents that are preferentially eliminated by the kidney (carboplatin, bleomycin, methotrexate, capecitabine, fludarabine) (Cova D, et al, 2004).

Therefore, there are three aspects to consider: changes in pharmacokinesis, in pharmacodynamics and the susceptibility of the tissues to the administered agents [12].

Pharmacokinesis: If absorption in the gastrointestinal tract is reduced, there may be an insufficient response to the drug. On the other hand, if what is reduced is the renal plasma clearance, or the hepatic catabolism, the toxicity of the drug will increase. In both cases, the dose should be adjusted less or more depending on the situation.

The hepatic uptake of a drug decreases with age, due to a lower splanchnic circulation, a smaller number of hepatocytes and a reduction in the activity of cytochrome P450, which is a protein whose function is to metabolize various xenobiotics and pharmacological agents. Inadequate distribution of the water-soluble agent can also occur due to reduced blood volume, hypoalbuminemia, or hypglobulinemia. This aspect is important, since many drugs are transported in the blood bound to albumin and hemoglobin [12].

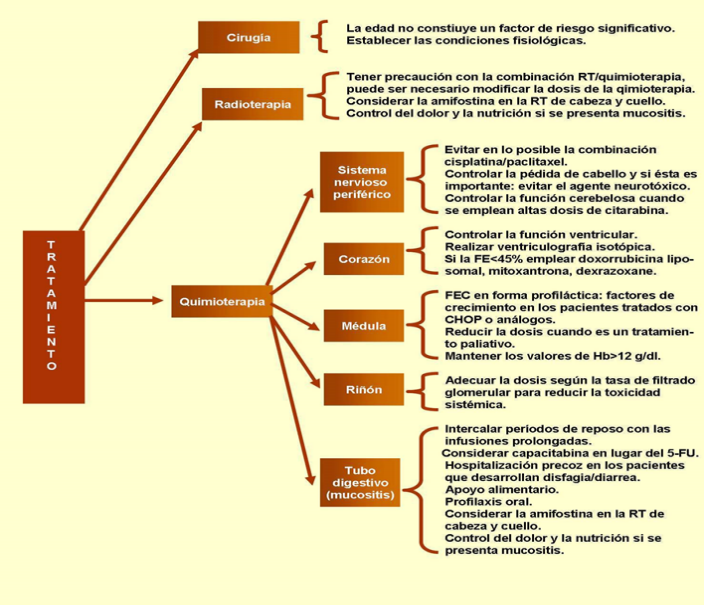
Pharmacodynamics: There may be a decrease in the rate of DNA repair or less intracellular catabolism of the drug (Rudd GN, et al, 1995).
Greater susceptibility of tissues to the cytotoxic agent: the most affected are the hematopoietic tissue, the digestive mucosa, the heart and the peripheral nervous system. Damage to hematopoietic tissue increases with aging and makes the patient prone to the risk of neutropenic infections, or to develop anemiaand thrombocytopenia. In any of these circumstances, the time of hospitalization of the patient increases (Morrison VA, et al, 2001). Most infections and deaths from infections have been found to occur during the first stage of treatment (Zinzani PG, et al. 1999). In the neutropenic elderly, filgrastim, an agent that acts as a human granulocyte colony-stimulating factor, has produced excellent results with a 40% reduction in the risk of febrile neutropenia (Chrischilles E, et al, 2002).

The practice of reducing the chemotherapy dose is not recommended. In several prospective studies of patients with lymphoma or breast cancer, it was observed that reducing the doses produced an increase in the relapse rate and a decrease in survival (Valagussa P, et al, 1994).

In the digestive tract, the destruction of the mucosa causes dysphagia, diarrhea, and dehydration. The elderly are very prone to mucositis, especially when receiving fluorinated pyrimidine treatments (Jacobson SD, et al, 2001).

Cardiomyopathy can develop in the heart when anthracyclines are used. Adriamycin, which belongs to the anthracycline family, exerts its toxicity on the myocardium and produces nonspecific cardiomyopathy, with vacuolization of myocardial cells and dilatation of mitochondria. This effect has as a consequence a progressive deterioration of myocardial contractility as the cumulative dose of anthracyclines increases, with production of ventricular dysfunction (Nousiainen T, et al, 2001).

In the peripheral nervous system, some agents cause neuritis and the best strategy is prevention, avoiding the combination of neurotoxic agents such as cisplatin and paclitaxel, and interrupting treatment when neuropathy progresses (Cova D, et al, 2004) (Fig. 5). The 2005 National Comprehensive Cancer Network established a series of recommendations that are summarized in



Pain treatment

The elderly person with cancer tends to have many apprehensions and fears regarding pain, such as: a) they consider that pain is a necessary part of the disease; b) afraid of bothering the doctor by insisting on pain; c) fear of addiction; d) fear of impaired cognitive function; and e) fear that when manifesting pain the hospitalization time will be prolonged. There are also economic reasons why the patient does not want to consume the necessary amount of analgesics [13].

It arises from all these aspects that the treatment of pain in the elderly with cancer is different from that of young individuals and usually receives less medication than necessary, but the doctor, the family and the personnel in charge of caring for the patient must know that pain in the elderly can be controlled and must be treated, since the patient has the right to the best possible quality of life.

In the elderly, paracetamol is preferable to non-steroidal anti-inflammatory drugs, because it involves a lower risk of kidney and gastrointestinal complications. As for opioids, such as morphine and hydromorphine, which share the same pharmacology, the kidney is responsible for eliminating the metabolites responsible for analgesic activity and some side effects. Therefore, it is necessary to know the state of glomerular filtration to avoid an increase in the plasma half-life of these agents. With opioids, the dose should be adjusted and, whenever possible, prolonged-release agents or methods should be used [13-16].

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