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Fertility preservation and cancer: How many persons are concerned?

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ABSTRACT

Objective: A significant proportion of cancer survivors experience chronic health sequelae, one of them being fertility impairment. However, even if many reports, guidelines and positions papers focus on fertility preservation and its needs, access to fertility preservation is not currently offered to all the patients concerned, and the targeted population is not well counted.

Study design: A cross sectional study was conducted using the French cancer cohort, a cohort covering the whole French population and including around 7 million of cancer patients. Women under the age of 40 and men under the age of 60 included in the cancer cohort in 2013 who had, in the first year, cancer surgery, chemotherapy or radiotherapy were considered. Patients treated by surgery alone for cancers in locations distant from the reproductive organs, or being treated for a cancer the past 3 years were excluded. The number of patients concerned by fertility preservation was estimated at a national and regional level, and by cancer types.

Results: 40,000 patients – 30,000 men under the age of 60 years and 10,000 women under the age of 40 years – were identified. A second estimation concerning women under the age of 35 and men under 50 reduced the number of patients to 17,200–10,400 men and 6800 women. The most frequent locations were malignant neoplasm of lymphoid and hematopoietic tissue, lung cancer, cervix uteri, prostate and colorectal cancer. In 2014, around 5 400 persons had a preservation.

Conclusion: Around 17,200 cancer patients of reproductive age should be informed about the fertility preservation options available. Medical professionals have to better integrate in their daily practice fertility preservation.

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Introduction

Advances in the diagnosis and treatment of numerous cancers have increased the chances of patients being cured. For many cancer types, five year survival in children, adolescents and adults reach 80% [1,2]. Unfortunately, a significant proportion of survivors experience chronic health sequelae that result from cancer, its treatment, or both. One of them is fertility impairment as a result of direct damage to the gonads (testicular or ovarian damage), or brain (hypothalamic pituitary axis damage) or reproductive system (uterus, prostate) or damage following surgery, radiotherapy (particularly of the pelvic or lower abdominal region) or reprotoxic chemotherapy. Many studies pointed out that impairment. For

instance, in the Childhood Cancer Survivor Study, female cancer survivors who were younger than 21 years at diagnosis had an increased risk of clinical infertility than their siblings [3]. The increased risk of infertility was seen in cancer survivors at very young ages, even though the majority of young female cancer survivors resume menstruation.

A number of clinical practice guidelines have been developed by groups in Europe and North America [4,5]. These guidelines differ in the definition of at-risk populations, surveillance modality, and frequency, as well as in their recommendations for interventions. Melan K [6] presents current strategies for fertility preservation with advantages, disadvantages, contraindications and outcomes: Embryo banking after puncture of mature or immature oocytes, cryopreservation, ovarian tissue transplantation, ovarian transposition. The authors pointed that health networks are essential to improve coordination of care, and the strengthening of this coordination is a major challenge to improve the performance of the health system.

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For France, reducing the side effects of treatments is therefore a major component of the 2014–2019 French Cancer Plan in order to improve the quality of life of the people affected, and must be a clinical research objective [7]. Access to fertility preservation is guaranteed by the French law on bioethics, which stipulates that “any person whose medical care is liable to impair fertility (. . .) may benefit from collection and storage (. . .) with a view to preserving and restoring their fertility”. It is also governed by the system for authorising healthcare establishments to offer cancer treatments and by specific accreditation criteria for the management of patients under 18 years of age. This management will be offered in an establishment or laboratory specifically authorised for fertility preservation, this authorisation being granted by regional health authorities for a period of 5 years.

However, even if many reports, guidelines and positions papers focus on fertility preservation and its needs, access to fertility preservation is not currently offered to all the patients concerned. For France, this was as underlined in the joint report produced by the French National Cancer Institute (INCa) and the French Biomedicine Agency concerning the consequences of cancer treatments and fertility preservation [8]. Moreover the targeted population is not well defined.

As a pragmatic approach, in this context and in order to best implement the necessary actions, it is necessary to determine how many people are potentially concerned at a country level. To this end, a study was conducted using cancer cohort data, a cohort covering the whole French population and involving around 7 million persons with a diagnosis of cancer.

Method

That observational cross sectional study was performed using the data from the cancer cohort. Briefly, the cancer cohort is made up of all patients with a cancer (in situ, invasive or neoplasm with uncertain behaviour) since 2010, having resulted in hospital or community medicine care or classification as a long-term illness (ALD). The objective is to follow up these patients over a long period of time (25 years after their inclusion) in order to gain more information on their use of health care, which could be useful for planning and organisation purposes. The data are taken from the French national health insurance information system (SNIIR-AM/SNDS) [9], which catalogues all health care consumption in the community or hospital setting (via the French information systems medicalization programme – PMSI) submitted for reimbursement as part of the compulsory health insurance system. At the time of inclusion, no distinction is made between incident cases (newly diagnosed) and prevalent cases (diagnosed in previous years).

Women under the age of 40 and men under the age of 60 included in the cancer cohort in 2013 having had, in the first year: cancer surgery (Diagnosis-related group (GHM): surgery associated with a primary diagnosis of cancer), chemotherapy (ICD 10 code Z51.1) or radiotherapy (ICD 10 code Z51.00 or Z51.0 or radiotherapy procedure performed in a private practice setting) were considered.

In order to estimate the incident population, patients having received cancer-related care in the past three years (2010–2012) or

with a previous long-term illness (ALD) for cancer were excluded, as were patients with a neoplasm with uncertain behaviour (TEI), and those treated by surgery alone for cancers in locations distant from the reproductive organs. These include localised surgery in the head, neck, chest, upper abdomen (stomach, small intestine, liver, bile ducts, pancreas, kidney, and adrenal glands), skin, limbs and nervous system.

The location of the cancer was determined based on the disease code associated with the long-term illness (ALD), and the ICD 10 codes present in the PMSI relative to the various fields (Medicine-Surgery-Obstetrics, Home Hospitalisation, and Follow-on Care and Rehabilitation). Several locations were identified for certain patients. These may be associated with genuine multiple locations or coding errors (primary tumour or metastasis, same cancer coded in several different ways).

The start date for defined as the first day of hospitalisation. However, the date care cannot be defined with any precision for radiotherapy procedures performed in the private practice sector. The date of the procedure was determined approximately based on the invoice date.

The results are given on a national and regional level, by cancer type, gender and 5-year age class. The analyses were performed using SAS v9.3 (SAS Institute, Cary, NC, USA).

The cancer cohort was approved by the French national ethic committee (*Comité consultatif sur le traitement de l'information en matière de recherche dans le domaine de la santé*).

Results

Of the 51,500 patients having undergone surgery, chemotherapy or radiotherapy in the first year, almost 12,000 were excluded from the target population because they only had surgery for cancers in locations distant from the reproductive organs.

While 40,000 patients – 30,000 men under the age of 60 years and 10,000 women under the age of 40 years – are identified in an initial estimation, a second estimation concerning women under the age of 35 and men under 50 reduces the number of patients to 17,200, 10,400 men and 6800 women (Table 1). Under the age of 39 – an age category concerning both genders – women are more numerous, and mainly affected by cervical cancer, followed by breast cancer.

The most frequent locations in these age groups are malignant neoplasm of lymphoid and haematopoietic tissue, lung cancer, cervix uteri, prostate and colorectal cancer (Table 2).

Within the various regions, the estimations vary from almost 4000 people in the Ile-de-France region to around 50 in Corsica (Fig. 1).

Discussion

Based on the whole French population, the French cohort cancer allowed identifying the proportion of patients that should undergo fertility preservation (or at least should have a personal option discussed and offered to patients). Even if medical staff should know the different fertility preservation methods and

Table 1
Estimation of the number of patients by gender and age class.

	AGE CLASS												Total M < 60 and W < 40	Total M < 50 and W < 35
	00–04	05–09	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59		
Men	328	238	230	332	553	763	1058	1264	2008	3618	7157	12031	29580	10392
Women	252	149	160	336	720	2080	3099	3920					10716	6796
Total	580	387	390	668	1273	2843	4157	5184	2008	3618	7157	12031	40296	17188

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