MYLORD

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Epidemiology of multiple myeloma: data from the french national health insurance database (SNDS)

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Background

Multiple myeloma (MM) is considered as an incurable hematologic disease. Net cancer-specific survival at 5 years after diagnosis of MM was estimated at 47% between 2005 and 2010 in France[a]. Thanks to significant improvements of the MM therapeutic management in the past decades, the overall survival of MM patients tends to increase, and some patients now achieve long-term remission. This directly impacts the dynamic of MM epidemiology. The world age-standardized MM incidence rate in France was estimated at 4.1 per 100,000 PY in 2020, based on extrapolations from available regional data. For the first time, this study provides updated and comprehensive epidemiological data by line of treatments based on the nationwide French National Health Insurance (NHI) databases, called SNDS ("Système National des Données de Santé"). These databases include hospital records, primary and secondary care, and deaths, for 66 million people.

The objective of the study is to estimate incidence, prevalence of MM and mortality of these patients, each year and for each line from 2014 to 2019, based on secondary use of data from the French NIH databases.

Methods

Design

This is a retrospective observational cohort study of MM patients identified through SNDS from 2014 to 2019. To identify patients with MM, a published algorithm[b] was used as a base and was expanded to consider recent evolutions of MM therapeutic management. The rates were standardized using the age distribution to allow international comparison. Treatment lines were re-constructed through ATLAS, an artificial intelligence algorithm adapted on the Smith-Waterman alignment sequence[c].

Inclusion criteria

Adult patients affiliated to the General health insurance Scheme (covering around 76% of the French population) were included if they presented either:

- **a hospital record with MM diagnosis (ICD-10 C90*), or**
- **a Long-Term Disease (LTD) status with MM diagnosis (ICD-10 C90*), or**
- **a treatment with lenalidomide or thalidomide paired with at least 2 protein electrophoresis on serum or urine in less than 4 months after the first delivery of the drug**

from January 1st, 2006 to December 31st, 2019.

Data since 2006 are used to define prevalent and incident patients. Incident MM patients were defined as patients without MM information (LTD or hospitalization with MM diagnosis codes or MM treatment) during the 2 years prior to index date. Analysis were conducted only on patients treated and alive on January 1st 2014.

Exclusion criteria

- Patients with only ICD-10 C90.1/C90.2/C90.3 and not treated during the follow-up
- Among patients treated with lenalidomide or thalidomide and paired with at least 2 protein electrophoresis, patients with no hospital stay for MM and with a hospital stay for another reason[1].

Conclusion

This study expands existing epidemiological data on MM patients in France and is the first to present recent nationwide results by line of treatment. Growing prevalence and incidence rates of MM are in accordance with the estimations from French network of cancer registries confirming that the French health insurance databases are a valuable source of data to further study the therapeutic management of MM.

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Total MYLORD study population

40,747 patients

treated for a MM between 2014 and 2019

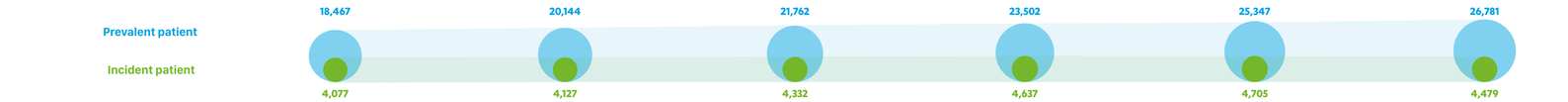
Study population

Characteristics of prevalent patients

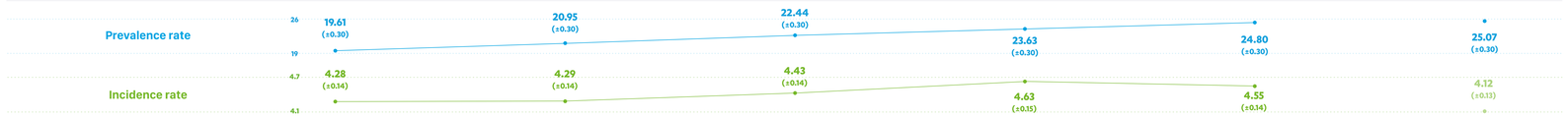
Frequencies of comorbidities[2] in prevalent patients

Epidemiology

Number of patients per year



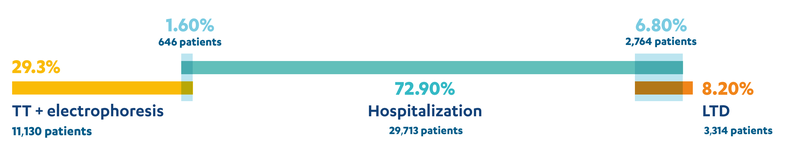
World age-standardized rates for 100,000 PY



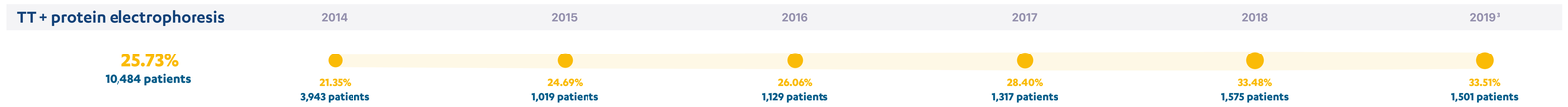
Mean time since first MM treatment in prevalent patients

First MM information

For 26,303 patients (64.5%), a hospital stay for MM was the first solely MM information reported during the inclusion period. Moreover, for about a quarter of the patients (N=10,484; 25.7%) the solely first reported MM information was the combination of a treatment received with thalidomide or lenalidomide (at least twice) and 2 protein electrophoresis from urine or blood sample within 4 months. It is also interesting to note this proportion increases with the years. The presence of LTD status was the first solely MM information for only 550 (1,4%) patients. The other patients (N= 3410 ; 8.4%) had combined MM information.



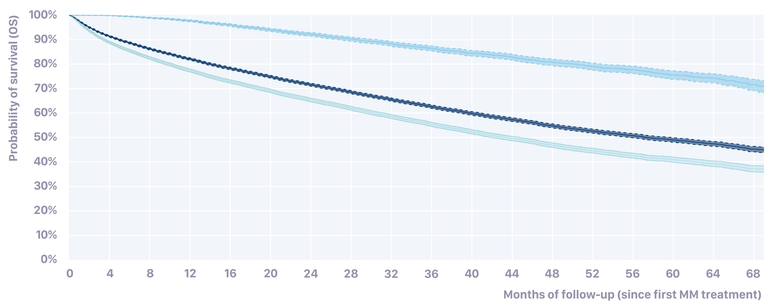
TT + protein electrophoresis



Mortality

Survival of 2014-2019 incident patients (26,357 patients)

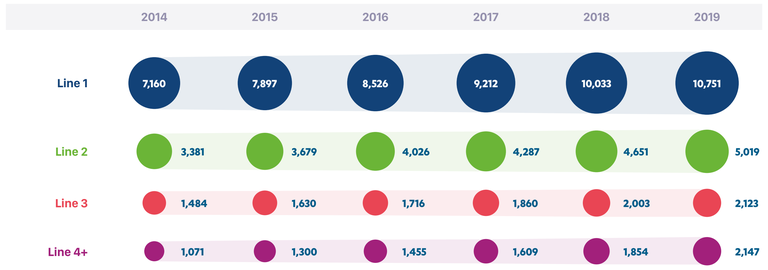
Standardized mortality rate was estimated at 4.0 (3.0-5.0) per 100,000 PY in 2018. The median overall survival time, of incident patients since 2014, calculated since first MM treatment, is 57.4 months.



Number of patients per line of treatment

Evolution of the number of patients in each line (including treatment frees intervals) on January 1st of each year from 2014 to 2019.

The number of treated patients for each line tends to increase overtime going for instance from 7,160 in 2014 to 10,751 in 2019 for patients in L1.



1. Principal diagnosis, related diagnosis or significant associated diagnosis for myelodysplastic syndrome (ICD-10 D46*) and/or follicular lymphoma (ICD-10 C82*) and/or diffuse non-Hodgkin lymphoma (ICD-10 C83*) and/or peripheral and cutaneous T cell lymphoma (with ICD-10 C84*) and/or other non-Hodgkin lymphoma (ICD-10 C85*) and/or osteomyelofibrosis (ICD-10 C47.4) and/or acute panmyelosis with myelofibrosis (ICD-10 C94.4) and/or POEMS syndrome (ICD-10 D47.7) and/or amyloidosis (ICD-10 E85*)

2. Based on the methodology and algorithms developped by the Caisse Nationale d'Assurance Maladie (CNAM)

3. The year 2019 should be interpreted with caution. We are missing some incident patients as 2020 year is requested to accurately identify MM patients

References

a. Monnereau et al. Survie des personnes atteintes de cancer en France métropolitaine 1989-2013. Partie 2 – Hémopathies malignes. Feb 2016

b. Palmaro A et al. Identifying multiple myeloma patients using data from the French health insurance databases. Medicine. 2017. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5371442/

c. M. Prodel, L. Lamarsalle and V. Augusto. ATLAS: A Robust Algorithm for TemporalSequence Alignment of Treatment Lines using Claim Databases. 2019. IEEE. Conference on Computational Intelligence in Bioinformatics and Computational Biology. (CIBCB), Siena, Italy, 2019, pp. 1-8. https://ieeexplore.ieee.org/document/8791467

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