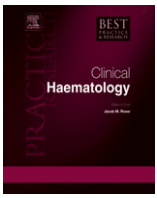
Best Practice & Research Clinical Haematology 22 (2009) 295–302

Contents lists available at ScienceDirect

Best Practice & Research Clinical Haematology

journal homepage: www.elsevier.com/locate/beha



2

Epidemiology of chronic myeloid leukaemia (CML)

Maren Rohrbacher, Doctor of Medicine [a], Joerg Hasford, Professor and Doctor of Medicine [b,*]

[a] *III. Medizinische Universitätsklinik, Medizinische Fakultät Mannheim der Universität Heidelberg, Wiesbadener Straße 7–11, 68305 Mannheim, Germany*
[b] *Institut für Med. Informationsverarbeitung, Biometrie und Epidemiologie, Ludwig-Maximilians Universität München, Marchioninistr.15, 81377 München, Germany*

Keywords:
epidemiology
chronic myeloid leukaemia (CML)
Philadelphia (Ph)/BCR-ABL positive
incidence
prevalence
clinical trials and practice
health care

Reliable epidemiological information on chronic myeloproliferative disorders (CMPDs), notably Philadelphia (Ph)/BCR-ABL-positive chronic myeloid leukaemia (CML), is rare. Incidence rates vary from 0.6 to 2.0 cases per 100 000 inhabitants, increase with age and are higher in men than in women. Geographic and/or ethnic variations might contribute to the variability of incidences among registries. Prevalence rate has increased by use of tyrosine kinase inhibitors.

In daily clinical practice, some CML management areas are not in line with the current recommendations. Problematic areas are suboptimal timing of treatment decisions under monitoring, and unawareness of new molecular monitoring techniques and of beneficial new tyrosine kinase inhibitors. Median age differs between cancer registries and clinical trials by 10–20 years. Reports of clinical studies underestimate the true age of the CML population. Elderly CML patients are underrepresented in clinical studies and thus have a reduced access to investigational therapies.

Incidence

Knowledge regarding clinical and molecular features of chronic myeloproliferative disorders (CMPDs), notably Philadelphia (Ph)/BCR-ABL-positive chronic myeloid leukaemia (CML), is increasing, but their epidemiology has not been studied in detail [1]. Sources of epidemiological data are mortality statistics [2], European cancer registries such as the Swedish Cancer Registry [3] or the Saarland

* Corresponding author. Tel.: +49 89 7095 7480; Fax: +49 89 7095 7482.
E-mail address: has@ibe.med.uni-muenchen.de (J. Hasford).

1521-6926/$ – see front matter © 2009 Elsevier Ltd. All rights reserved.
doi:10.1016/j.beha.2009.07.007

Registry [4] in Germany or the database of the Surveillance, Epidemiology and End Results (SEER) Program of the United States (U.S.) National Cancer Institute [5].

Cancer registration in Sweden [3], a country with about 9 million people, is based on compulsory reporting by physicians in all public and private health-care facilities. It has been estimated that 96% of all diagnosed cases are reported to this registry [6]. The Saarland Registry [4] is the only German contributor to provide reliable incidence data for the whole of its area, covering a population size of 1 million [6]. The database of SEER [5] conducts epidemiological evaluations in several areas in the United States. For these evaluations, data are derived from nine different registries with about 26.5 million inhabitants covering approximately 10–14% of the population [5].

There is a high variability of crude and standardised CML incidence rates with 0.6–2.0 cases per 100 000 inhabitants [3–12] (Table 1). The incidence of CML increases with age [3–5,7–10]. CML occurs in greater frequency in men than in women: the male-to-female ratios range between 1.3 and 1.8 [3–5,7,9,10].

Between 1993 and 2004, the 2nd Edition of International Classification of Diseases for Oncology (ICD-O) (WHO Geneva 1990) for coding CML cases was commonly used, which did not differentiate true CML, Ph and BCR-ABL-negative CML, chronic myelomonocytic leukaemia (CMML) or sub-acute myeloid leukaemia. Since 2005, the distinction between BCR-ABL-negative and -positive status has been possible based on the new third edition of ICD-O (WHO Geneva 2000), but data with and without BCR-ABL status has not been separately published in the latest cancer reports (Table 1). Consequently, the published incidences for CML may be higher than the true ones as BCR-ABL-negative cases are included.

A crude incidence of Ph/BCR-ABL-positive CML of 0.6/100 000 is available from the Scotland Leukaemia Registry [8] and from an epidemiological survey in the southwest of Germany [10] (Table 1). Both studies covered a population size of 9 million inhabitants. In the German study [10], the incidence of all reported 218 CML cases, including negative and unknown Ph/BCR-ABL status was 0.8, and of CML and CMML (0.2) combined 1.0. As the Ph/BCR-ABL status was available for only 87.2% of the German CML patients and not for any of the 61 patients with a diagnosis of CMML, incidence estimates provided there represent the lower margin of the true CML incidence.

The variations of incidences amongst published CML reports might indicate geographic or ethnic variability beyond technical artefacts. Some registries try to increase data quality by standardisation according to the age structure of the world standard population (WSP). WSP weighs age-specific incidences in populations with higher proportions of younger ages than in the European standard population [13]. As all publications considered in Table 1 stem from northern Europe [3,4,7–12] or USA [5] and as CML is primarily a disease of the elderly, an age-specific evaluation appears more appropriate. There seems to be variability of incidences of geographic areas even in the same country as exemplified by the Swedish National Cancer Registry [3] and the Goteborg Central Disease Registry

Table 1
Crude and standardized CML incidences of population based registries and surveys [Ref. No.].

	Time of observation	Number of patients	Incidence crude	Incidence (WSP) *)
SEER [5]	1998–2000	–	–	1.8 **)
	2000–2005	4460	–	1.0
France [12]	1985–2006	906	–	0.8
Swedish Cancer Registry [3]	1998–2000	260	1.0	0.7
	2006	87	1.0	0.7
Scotland Leukemia Registry ***) [8]	1999–2000	64	0.6	–
Thames Registry [7]	1999–2000	180	–	0.8
Leukemia Research Fund [9]	1984–1993	1115	–	0.6
Cancer Registry of Saarland [4]	1998–2000	65	2.0	1.0
	2005	16	1.5	0.7
Southwest Germany ***) [10]	1998–2000	172	0.6	–
Southeast Germany [11]	2004	201	1.93	1.3

*) World Standard Population.
**) United States Standard Population.
***) CML cases with known Ph/BCR-ABL positive status.