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Letter to the editor / Lettre à l'éditeur

Time to inpatient follow-up care and rehabilitation: Survival analysis for benchmarking purposes

Délais d'admission en soins de suites et réadaptation : l'analyse de survie au service du benchmarking

Keywords: FCR ; DH ; Survival analysis ; Benchmarking

Mots clés : SSR ; HDJ ; Analyse de survie ; Benchmarking

1. English version

1.1. Introduction

The daytime hospitalization (DH [HDJ, in French]) sectors of specialized follow-up care and rehabilitation (FCR [SSR, in French]) services treat patients requiring the intervention of a multidisciplinary team (physicians, physical therapists, occupational therapists, speech therapists…) and who are sufficiently autonomous and/or supported to justify having them stay in their own homes [1,2]. In this respect, they correspond to the French decree No. 92-1102 of 2 October 1992 pertaining to the ''technical conditions of functioning that must be met by health care structures existing as alternatives to hospitalization'' [3].

In the ''internal'' branch, the patient is transferred from the complete hospitalization (CH) sector of FCR to DH. In the ''external'' branch, the patient is directly referred to DH-FCR either from his home through specialized physical and rehabilitation medicine consultation or from an acute service (in case of an upper limb operation, for example).

Treatment duration is at times short (multidisciplinary evaluation or expertise, evaluation and local treatment of spasticity, education in use of self-administered urinary elimination devices, validation of electric wheelchairs…) and at times longer (reinduction therapy after a stroke, back exercises, reeducation of a limb following surgery, readaptation to effort…). Admission to the internal branch is generally immediate (direct transfer from CH to DH). As regards the external branch, on the other hand, excessively lengthy waits for admission (several months) are far from rare, and they are incompatible with a therapeutic project, especially in cases of post-acute care. Mean or median rates and delays of admission can in this respect be considered as important factors in management of DH-FCR units. More specifically, the two parameters – percentages, days elapsed – can be used as means of monitoring DH functioning over time and of establishing comparisons between several units.

In the present work, we have applied a method that is well-known but new in the context: survival analysis (SA). It effectively complements the above-mentioned parameters by indicating:

- the admission rate (''death'' event in SA) according to time elapsed since the request for admission;
- the time needed to successfully process a given percentage of the requests.

Moreover, graphic SA presentation is particularly well-suited to benchmarking between several hospitalization units and to monitoring a unit over time. Finally, it is possible to draw statistical comparisons between several survival curves.

1.2. Method

Three DH-FCR facilities in the French region of Bourgogne (Burgundy) participated in this study: the orthopedics DH and the neurology DH of the university hospital center of Dijon (DH-DO and DH-DN) and the orthopedics-neurology DH of the Tonnerrois hospital center (DH-T).

Admission requests for these three units were compared over the January–August 2013 period. During the last three months of 2013, the DH-T unit had been reorganized for the purpose of streamlining processes in the external branch. Reorganization essentially involved dedicated DH therapists and the weekly program of patient management. Analysis of the unit was subsequently renewed for the January–August 2014 period.

Requests for admission to a single-location DH (validation of electric wheelchair, botulinum toxin injection…) are generally not subjected to the same constraints and do not entail waits for admission as long as those entailed by requests for treatment in series of locations; as a result, they were not taken into consideration.

Median rates and delays of admission were calculated. Survival analysis (SA) was carried out to compare the three DH facilities and to appraise the evolution having taken place in Tonnerrois unit from 2013 to 2014. Survival curves were drawn up according to the classical Kaplan-Meier [4] method, while comparison was carried out using the Log-rank test [5]. Calculations were performed using Number Cruncher Statistical System 9 software [6].

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1.3. Results

1.3.1. Comparison of the three DHs

From January to August 2013, twelve requests for admission to the external branch were received by DH-DN, and 10 (83%) were honored prior to the end of the period, with median turnaround time of 53 days (from 18 to 146). DH-DO received 14 requests of which 10 (71%) were honored, with median turnaround time of 122 days (from 30 to 214). Forty-one requests were addressed to DH-T, of which 10 (24%) were honored, with median turnaround time of 111 days (from 8 to 242).

Survival curves for the three units are presented in Fig. 1. It may be observed that after 60 days, 33% of the admission requests had not been honored at DH-DN (percentage corresponding to that of the SA "survivors"), 83% at DH-DO and 90% at DH-T. In order to honor half of the admission requests, it had taken an average of fifty-seven days for DH-DN, compared with 123 for DH-DO and 246 for DH-T. The Log-rank test used for comparison of the three survival curves was statistically significant ($P < 10^{-6}$).

1.3.2. The evolution of DH-T from 2013 to 2014

From January to August 2014, out of twenty-one requests for admission to the external branch received by DH-T, 19 (90%) were honored prior to the end of the period. Median turnaround time for admission was 17 days (from 0 to 78).

Survival curves for 2013 and 2014 are depicted in Fig. 2. It may be observed that from one time period to the next, the percentage of admission requests that had not been honored after 60 days of waiting had plummeted from 90% to 5%. In 2014, it took an average of nineteen days for DH-T to honor half of the admission requests, compared with 246 in 2013. The Log-rank test comparing the two survival curves was statistically significant ($P < 10^{-6}$).

1.4. Discussion

We used survival analysis (SA) according to the Kaplan-Meier method with the Log-rank test to compare the rates and delays of admission in three DH-FCR units and to measure their evolution over time. The method provides numerical and graphical results that are easy to interpret and suited to the objective of our study. It enables interested parties:

- to estimate the percentage of actual admissions (SA "death" event) according to the time elapsed since the request;
- to calculate the time needed to honor a given percentage of the requests;
- to compare the "survival curves" of several departments.

It is applied in most (paid) statistical software and uses only the data regularly collected in the FCR units, which is to say data and status of the admission request at the moment of the study ("admission on hold" or "patient admitted on xx/xx/20xx"). Needless to say, only the accepted admission requests shall be taken into consideration.

In our study, the impact of the action carried out in the Tonnerrois hospital center on admission in DH-T from 2013 to 2014 is perfectly illustrated by SA. That much said and as is the case with any strictly quantitative method, it is not meaningful unless it is completed by a qualitative analysis. In actuality, the low rate of admission to DH-DO at 60 days is not due to insufficient accommodation capacity or poor organization. In fact, the unit is limited to chronic lower back pain patients enrolled in a reconditioning program. Most members of this

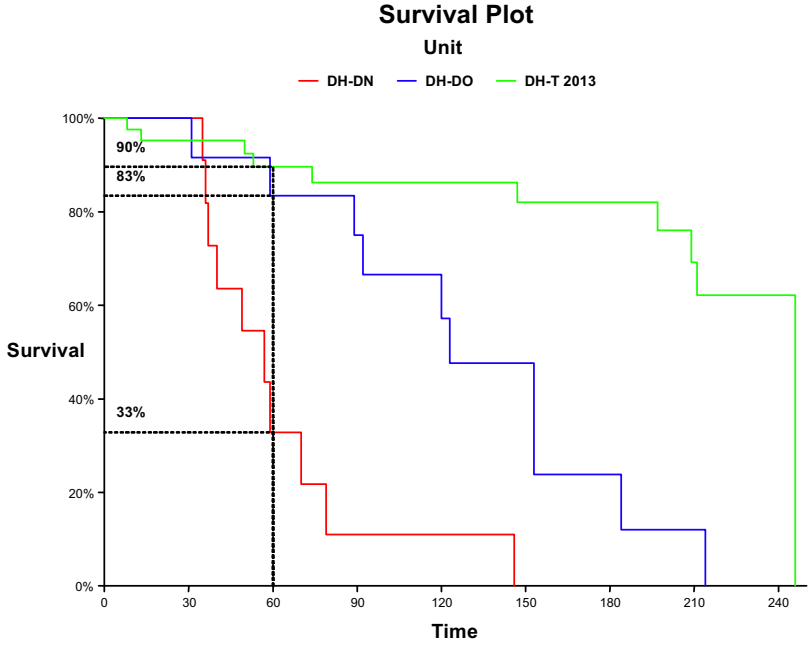

Fig. 1. Survival analysis curve for comparison between the three DHs. At 60 days, 33%, 83% and 90% of admission requests had not been honored by DH-DN, DH-DO and DH-T, respectively.