In France, a certain number of hospital drugs are listed at the national level to be charged to health insurance, in addition to hospital stay fees based on diagnosis related group (DRG) tariffs.

This list, called “liste en sus”, is regularly updated with new entries as innovative and expensive drugs reach the market.

When they begin to be used more widely and/or their cost decreases, drugs should be removed from this list and put back into the DRG system.

Erythropoiesis-stimulating agents (ESA) were removed from the “liste en sus” in March 2014.

To evaluate the impact of change in reimbursement system on the use of ESA, for the treatment of anemia in patients with chronic kidney disease (CKD) on dialysis.

Inclusion criteria

All adult patients with CKD on dialysis and receiving ESA treatment during one of the two periods.

Variables

- Patients' age and sex
- Primary kidney disease
- Time on dialysis
- own hemoglobin (Hb) concentration
- monthly consumption
- Iron consumption
- ESA consumption

Table 1 – Patients' characteristics

<table>
<thead>
<tr>
<th>Patients' characteristics</th>
<th>Period 1: &quot;liste en sus&quot; system (01/05/2012 - 29/02/2014) N=569</th>
<th>Period 2: DRG system (01/03/2014 - 31/12/2015) N=585</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex-ratio</td>
<td>1.45</td>
<td>1.45</td>
</tr>
<tr>
<td>Median time on dialysis</td>
<td>3.4</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Table 2 – Hemoglobin levels

<table>
<thead>
<tr>
<th>Variables</th>
<th>Period 1: &quot;liste en sus&quot; system (01/05/2012 - 29/02/2014)</th>
<th>Period 2: DRG system (01/03/2014 - 31/12/2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Hb (g/l)</td>
<td>110.5 ± 10</td>
<td>108.4 ± 10</td>
</tr>
<tr>
<td>Mean rate of Hb &gt; 120 g/l</td>
<td>27.8 %</td>
<td>19.2 %</td>
</tr>
<tr>
<td>Mean rate of Hb &lt; 100 g/l</td>
<td>21.5 %</td>
<td>24.5 %</td>
</tr>
<tr>
<td>Mean Hb consumption (g)</td>
<td>418</td>
<td>490</td>
</tr>
</tbody>
</table>

Figure 1 - Design

- March 2014: Withdrawal of ESA from the list
- Old reimbursement system
- New reimbursement system
- 22 months
- Comparison of practices

Figure 2 – Origin of nephropathy

- Unknown: 3.4%
- Other: 8.2%
- Polycystosis: 22.8%
- Vascular nephropathy: 16.7%
- Chronic tubulo-interstitial nephropathy: 18.1%
- Glomerulopathy: 27.1%
- Diabetes: 28.4%

- Period 1: "liste en sus" system
- Period 2: DRG system

A significant decrease of the mean Hb level (p<0.05) was observed between the “Liste en sus” period and the “DRG” period;

The Hb target seems to be lower in the second period;

Patients seem to be over-treated in the period 1 compared to under-treated in the period 2;

The average consumption of iron increased significantly during the second period;

The total consumption of ESA stayed proportional to the number of patients.

This study shows a lower hemoglobin rate target (which can also be related to the evolution of recommendations) and an increase in iron use, but no decrease in the ESA consumption. It seems that the reimbursement change had little impact on the use of ESA for treatment of anemia in patients on dialysis.

Further criteria, like the Charlson comorbidity index, erythropoietin resistance index, number of transfusions, should be evaluated to explain these results and confirm the clinical relevance of the effects observed.