Multiple Sclerosis: Patient Characteristics and Cost Concerns

By Charles Bankhead, Medical Writer

Several new posters focusing on patients with multiple sclerosis (MS) were presented at the 2012 Educational Conference of the Academy of Managed Care Pharmacy (AMCP), October 3-5, 2012, Cincinnati, OH.

Relapse and Symptoms Identify Patients with High-Risk Disease

The number of relapses and symptom burden predict an increased risk of relapse in patients with MS, according to a poster presented by Karina Raimundo, BS, Economics and Health Outcomes Research Fellow at Novartis Pharmaceuticals, East Hanover, NJ, and colleagues. More frequent relapses in the previous 12 months doubled the odds for a current high-relapse status, and MS symptoms in the previous year increased the odds by almost 90%. The number of disease-modifying therapies (DMTs) used in the past year increased the risk of high-frequency relapse by 30%.

High relapse activity (HRA) in patients with MS can lead to more rapid progression of disability and worse clinical outcomes. However, factors associated with HRA remain unclear, according to Ms Raimundo and colleagues. In addition, the effect of reducing HRA on the cost of care for patients with MS has not been thoroughly evaluated.

To identify predictors of HRA, Ms Raimundo and colleagues searched records in the MarketScan Commercial and Medicare Database for patients who had at least 1 International Classification of Diseases, Ninth Revision (ICD-9) entry related to MS during 2009 and at least 1 entry between 2005 and 2008. They defined HRA as ≥2 relapses during 2009.

Of 13,344 patients who met study eligibility criteria, 622 had HRA. Patients with HRA were younger, had a higher Charlson comorbidity index score (0.7 vs 0.6, respectively), and were significantly more likely to have an ICD-9 code for MS symptoms in the previous year (83.0% vs 69.4%, respectively). They also had a significantly (P < .001) higher mean number of relapses in 2008 (1.6 vs 0.2, respectively) and in 2007 (1.3 vs 0.2, respectively).

 Logistic regression analysis showed that patients with MS symptoms in 2008 had an odds ratio (OR) of 1.86 for HRA versus patients who had no symptoms in the previous year (P < .001). The relapse rates in 2007 and 2008 predicted the increased likelihood of HRA in 2009 (OR, 1.39 in 2007 and 2.40 in 2008; P < .001 for both). The number of DMTs used in the previous years also significantly increased the likelihood of HRA in 2009 (OR, 1.29).

These findings suggest that several factors may provide clues to early identification of patients with more aggressive forms of MS, according to the investigators. Earlier identification of patients with aggressive disease would afford an opportunity for earlier initiation of effective MS therapies and could potentially minimize the long-term adverse effects of the disease process. [Raimundo K, et al. Predictors of high relapse activity in a multiple sclerosis population using US medical claims database.]

Adherence to MS Therapies Significantly Impacts Cost-Effectiveness

Adherence to therapy was the deciding factor in an analysis of the cost-effectiveness of MS therapies, Ms Raimundo and colleagues reported in a second poster presentation. They evaluated the impact of adherence on relapse and of cost-effectiveness associated with first-line DMTs for patients with relapsing forms of MS.

The lymphocyte-targeted drug fingolimod was associated with the best patient adherence, leading to a 2-year cost of $90,566 per avoided MS relapse, more than $50,000 less than the next closest agent. This indicates that adherence should figure into evaluations of the value of therapies for MS, along with efficacy and tolerability.

DMTs have become the cornerstone of treatment for MS and have demonstrated the ability to prevent or delay progression to permanent neurologic disability. The currently available DMTs for MS vary in terms of cost, and the contributions of patient adherence to cost have not been examined in detail.

Another poster presented at the AMCP meeting showed that adherence to first-line DMTs, defined as medication possession ratio ≥80%, was 89.2% with fingolimod, 72.4% for subcutaneous (SC) interferon (IFN) beta-1b, 77.8% for SC IFN beta-1a, 82.1% for glatiramer acetate, and 79.2% for intramuscular (IM) IFN beta-1a (Abouzaid S, et al. Comparison of compliance with fin-
golimod and other first-line disease-modifying treatments among patients with multiple sclerosis). Using those figures, Ms Raimundo and colleagues evaluated the impact of adherence on the rate of relapse and cost-effectiveness for first-line DMTs in MS from the perspective of a US commercial payer.

The cost of relapse was based on the severity of the relapse and the cost of managing the relapse. The relative incidence of relapse severity was assumed to be the same for all DMTs. Wholesale acquisition costs for DMTs were obtained from Analy$ource, a web-based pricing tool.

The impact of nonadherence was based on a published estimate showing that adherent patients had a statistically significant 29% lower risk of relapse compared with nonadherent patients (Tan H, et al. *Adv Ther.* 2011; 28:51-61).

The results showed that fingolimod was associated with a cost of $90,566 per avoided relapse. Among the other DMTs, the estimated costs for each relapse episode avoided were $142,268 (Extavia) and $153,944 (Betaseron) for SC IFN beta-1b; $155,486 for SC IFN beta-1a; $174,097 for glatiramer acetate; and $370,397 for IM IFN beta-1a.

The investigators concluded that adherence has a significant effect on real-world effectiveness of DMTs in MS, which in turn influences cost-effectiveness. Higher rates of adherence with fingolimod would translate into higher estimated real-world effectiveness in the model used in the study. [Raimundo K, et al. Cost-effectiveness of multiple sclerosis treatments: effects of adherence.]

**MS Relapse Exacts Heavy Toll on Direct, Indirect Costs**

The relapses of MS substantially increased direct and indirect costs, which rose even higher with the severity of relapse, according to a poster presented by Hélène Parisé, MA, an economist with the Groupe d’analyse Itéé, Montréal, Canada, and colleagues.

Many studies have demonstrated a significant economic burden associated with MS, which affects direct and indirect costs. Nonetheless, studies assessing the economic impact of relapse severity have been lacking, Ms Parisé and colleagues noted.

To characterize the economic impact of MS relapses, the investigators searched the OptumHealth Reporting and Insights database for the period from January 1999 through December 2011 to identify patients with ≥2 primary or secondary MS-related diagnoses. Characteristics of patients who met the diagnostic criteria were evaluated beginning 180 days before the first MS diagnosis and were extended to the first year after diagnosis.

Severe relapse was defined as an MS-related episode requiring hospitalization, and relapses of low or moderate severity were defined as episodes requiring an outpatient or emergency department visit.

A total of 9421 patients with MS were identified, including 7686 patients with no relapses, 1220 with ≥1 low or moderately severe relapses, and 515 with at least 1 high-severity relapse. Compared with patients who had no relapses, those with low or moderately severe relapses were younger and healthier (by the Quan-Charlson comorbidity index), and patients with high-severity relapses had more cardiovascular disease, diabetes, and use of antidepressants, and were less likely to be employed.

At 12 months, patients with no relapses had mean all-cause direct costs of $17,545 compared with $28,348 for patients with low or moderately severe relapses and $41,969 for patients with severe relapses. MS-specific costs averaged $8803 for patients with no relapses, $18,981 for patients with low or moderately severe relapses, and $29,355 for patients with severe relapses.

All-cause indirect costs at 12 months of follow-up averaged $4146 for relapse-free patients, $5610 for patients with low or moderately severe relapses, and $9226 for patients with severe relapses. MS-specific indirect costs averaged $1613, $3238, and $6939 for patients with no, low or moderately severe, and severe relapses, respectively.

This cost disparity for direct and indirect costs persisted in an analysis to 36 months after the diagnosis of MS. Overall, the average per-patient per-year direct costs increased by almost 60% with low-to-moderately severe relapse, and the costs more than doubled with a severe relapse. Indirect costs doubled with severe relapse and increased by 50% with low or moderately severe relapse. Much of the difference between relapse-free patients and those with relapses resulted from increased MS-specific costs, suggesting that interventions that reduce the frequency and severity of MS relapses can help reduce the cost of care for patients with MS. [Parisé H, et al. Direct and indirect costs associated with relapse of multiple sclerosis.]