To the Editor

Avonex® PEN Satisfaction and Patients Experience Clinical Trial

Adherence to long-term parenteral therapies can be challenging both physically and emotionally for many patients. Consequently, poor adherence and early discontinuation of therapy are common and have been associated with adverse events to therapy, perceived lack of efficacy, treatment fatigue, injection anxiety, and needle phobia[1,2]. In the context of multiple sclerosis (MS) patients, symptoms of the disease itself including cognitive deficits and impaired manual dexterity can make self-injection even more difficult.

Although adherence can be improved through better patient education of their disease, improvement of drug delivery devices may also reduce the burden of the injection process and increase patient tolerability and satisfaction with treatment[3]. To this end, several autoinjection devices have been introduced for disease-modifying drugs (DMD) and have been associated with fewer injection site reactions, increased patient preference compared with manual injections, and greater treatment adherence[2,4,5].

The AVONEX® PEN is the first autoinjector for once weekly intramuscular (IM) interferon beta-1a (IFNβ-1a) and has been designed with features that simplify the injection process and may help patients overcome injection-related issues. These features include automated needle insertion and medication delivery, a safety lock to prevent accidental injection, and an activation button with an audible click to denote the beginning of the injection process. The needle is hidden within the device during the injection process and dose delivery is confirmed by a visual display window, which turns yellow once the full dose has been dispensed. The dimensions of the device have also been designed to improve handling and stabilization during the injection process[5].

This was a Phase IV, observational, open-label, multicentre study to determine if simplifying injection methods would enhance patient satisfaction with the new autoinjector device for once weekly IM IFNβ-1a. Additional objectives of this study were to evaluate the ease of use and clarity of directions for use of this single-use autoinjector pen.

Eighty-nine (89) patients from ten sites across Canada who fulfilled the inclusion criteria were entered into an eight week IM IFNβ-1a treatment period using the autoinjector pen between June 2011 and March 2012. Patients aged 18-65 newly prescribed 30 mcg once weekly IM IFNβ-1a via autoinjector pen were all previously self-injecting once weekly IFNβ-1a via prefilled syringe for at least 12 consecutive weeks prior to inclusion in the study. Patients must have been able to demonstrate the use of the autoinjector pen and self-administer the injections throughout the duration of the study.

The patients administered injection one at the study centre using the autoinjector pen following training provided by the clinic nurse investigator and under his/her supervision. Patients then completed a three-part questionnaire to assess their satisfaction with the autoinjector pen, and the ease of injection and clarity of directions for use of the autoinjector pen. All further injections of once weekly IM IFNβ-1a were self-administered by patients at home. Patients completed a second questionnaire following their Week 8 injection with the autoinjector pen. Patients were also contacted via telephone at Week 8 to assess patient compliance and persistence on the medication. Patients who received at least one injection using the autoinjector pen were included in the analysis. Data were summarized using basic descriptive statistics and no formal statistical testing was performed.

Of the 89 patients enrolled in the study, 69 (78%) patients completed the study. Patients were predominantly women (79.8%), with a mean age (SD) of 44.2 (9.7), a mean (SD) MS duration of 12.6 (9.4) years since MS symptom onset, and a mean (SD) duration on IM IFNβ-1a of 5.0 (3.7) years.

In this study, 98.7 percent (95% CI = [96.1%, 100%]) of patients at baseline and 93.2 percent (95% CI = [86.6%, 99.8%]) of patients at Week 8 were satisfied with the autoinjector pen. Patients rated the autoinjector pen a mean score (SD) of 9.2 (1.5) at baseline and 9.0 (1.6) at Week 8, where scores ranged from zero (defined on the form as "much worse") to 10 (defined on the form as "much better"), when compared against the manual injection with prefilled syringe.

The autoinjector pen was quickly accepted with 100 percent of patients at baseline and 95.3 percent (95% CI = [90.0%, 100.0%]) of patients at Week 8 indicating that they would use this single-use autoinjector to administer their medication. The majority of patients at both baseline (87.6%) and Week 8 (85.3%) also indicated that they would definitely switch from the manual injection with prefilled syringe to the autoinjector pen. Furthermore, 95.1 percent (95% CI = [90.3%, 99.9%]) of patients at baseline and 95.4 percent (95% CI = [90.2%, 100.0%]) of patients at Week 8 preferred the autoinjector pen to the manual injection with prefilled syringe.

Patients also provided feedback regarding features of the autoinjector pen they either liked or disliked, which is summarized in Tables 1 and 2. In comparison with the prefilled syringe, patients also rated the autoinjector pen on all key features of the injection process. The mean (SD) scores of the key features (ease in holding and gripping, ease of injection, level of injection pain, ability to self inject, and level of needle anxiety) were 8.9 (1.7), 9.2 (1.3), 8.6 (1.8), 9.0 (1.5), and 8.7 (2.0) at baseline, respectively; and 8.7 (1.6), 9.0 (1.6), 8.4 (1.9), 8.9 (1.7) and 8.8 (1.7) at Week 8, respectively. Scores ranged from zero (defined on the form as "much worse") to 10 (defined on the form as "much better").

Patients highly rated the ease of use and clarity of direction for use of the autoinjector pen. On average, patients found the autoinjector pen easy to use with mean scores (SD) for ease of use of 8.7 (1.9) at baseline and 9.0 (1.5) at Week 8, where scores ranged from zero (defined on the form as "extremely difficult") to 10 (defined on the form as "extremely easy"). The mean (SD) scores describing the ease to read, ease to understand, patient satisfaction with the level of detail, and patient satisfaction with the presentation of the autoinjector instructions were 9.1 (1.4), 9.3 (1.2), 9.2 (1.3), and 9.4 (1.1) at baseline, respectively; and 9.2 (1.0), 9.0 (1.2), 9.1 (1.2), and 9.0 (1.2) at Week 8, respectively. Scores ranged from zero (defined on the form as "extremely difficult"/"extremely dissatisfied") to 10 (defined on the form as "extremely easy"/"extremely satisfied").

There are certain limitations of this study that should be considered. Firstly, the questionnaires and scales used in the study were subjective and were not formally validated. Bias may

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Table 1: Features of the single-use autoinjector pen liked by patients

Feature	Baseline Response frequency, n (%)	Week 8 Response frequency, n (%)
Easier to inject	75 (84.3)	55 (79.7)
Less painful	68 (76.4)	48 (69.6)
Reduces anxiety about taking injections	65 (73.0)	47 (68.1)
Easier to prepare	63 (70.8)	54 (78.3)
Easier to handle	61 (68.5)	55 (79.7)
Less time consuming	53 (59.6)	51 (73.9)
Increases injection confidence	50 (56.2)	48 (69.6)
Needle shield	50 (56.2)	38 (55.1)
Activation button	41 (46.1)	32 (46.4)
Injection indicator window	40 (44.9)	29 (42.0)
Other		
Injection independence	0 (0)	5 (7.2)
Shorter needle	1 (1.1)	1 (1.4)

Table 2: Features of the single-use autoinjector pen disliked by patients

Feature	Baseline Response frequency, n (%)	Week 8 Response frequency, n (%)
More bruising with the device	0 (0)	7 (10.1)
More painful to use the device	4 (4.5)	4 (5.8)
Device too big	3 (3.4)	3 (4.3)
Too difficult to use the device	2 (2.2)	2 (2.9)
Device too complicated	0 (0)	2 (2.9)
Instructions need improvement	2 (2.2)	1 (1.4)
Too forceful an injection with the device	1 (1.1)	0 (0)
Other		
Activation button difficult to activate	10 (11.2)	14 (20.3)
Less control over injection	1 (1.1)	3 (4.3)
Concerns needle may be too short	0 (0)	2 (2.9)
Uncertain entire dose administered	1 (1.1)	1 (1.4)
Noise of the activation button	1 (1.1)	1 (1.4)
Requirement to hold needle inserted for 10 seconds	0 (0)	1 (1.4)
More time consuming	0 (0)	1 (1.4)
Increased anxiety due to inability to see needle	1 (1.1)	0 (0)

have been introduced into the study as only patients actively interested in the autoinjector pen were enrolled. In addition, the small sample size and missing data from 20 patients may influence the results. It is important to note that patient experience with prefilled syringe was not formally evaluated in this study and assessments were only completed by patients after starting treatment with the autoinjector pen. For the primary endpoint, patient satisfaction questionnaire, patients were required to rely on their past experience with the prefilled syringe when comparing their satisfaction with the autoinjector pen. Taking this into account, the requirement of having patients' compare their autoinjector pen experience to prefilled syringe after eight weeks on treatment (nine weeks since patients' last experience with prefilled syringe) may influence the results. For the secondary objectives, patients completed assessments directly relating their experience with the autoinjector pen, however, no comparator data was collected for prefilled syringe.

The high patient satisfaction, ease of use, and clarity of direction provided with the autoinjector pen support its use as a delivery option for patients. As the majority of patients preferred the autoinjector pen and indicated that they would definitely switch to it, the autoinjector pen may be associated with improvements with the overall injection experience.

Disclosure

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