Disposal of injection material used for the treatment of hepatitis C: comparison with insulin-dependent diabetes and thromboembolism

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SUMMARY

Aim — The survey conducted in the Provence-Alpes-Côte d’Azur region in France in 1999 showed that 38% of patients infected with the hepatitis C virus (HCV) receiving interferon injections in their home were aware of the recommendations concerning the disposal of injection material and that 41% of the needles were discarded with household waste after use. The purpose of our study conducted in the Centre region of France was to ascertain how injection material used by HCV-positive patients for interferon treatment are disposed of in comparison with material used by patients injecting insulin for insulin-dependent diabetes mellitus (IDDM) or low-molecular-weight heparin (LMWH) for thromboembolism.

Material and methods — A questionnaire to be completed by patients was proposed to HCV-positive patients attending hepatogastroenterology clinics in the Centre region hepatitis C network for therapeutic follow-up (N = 113 patients) between October-2001 to January-2002. The same questionnaire was proposed to patients attending follow-up consultations for insulin-dependent diabetes mellitus (N = 85 patients) or thromboembolism (N = 23 patients) between March-June 2002.

Results — Significantly more patients stated they were aware of recommendations for disposal of injection material in the HCV group (89%) than in the IDDM (67%) or LMWH (26%) groups (P < 0.01). Injection material was discarded with household waste less often by patients in the HCV group (6%) than in the IDDM (32%) or LMWH (29%) groups (P < 0.001) and more often collected in a safety box prior to incineration (73% in the HCV group versus 63% and 14% in the IDDM and LMWH groups respectively). The safety box was discarded with household garbage more often by patients in the IDDM (54%) or LMWH (50%) groups than in the HCV group (0%) (P < 0.001). Equivalent proportions of the patients said they recapped the needle after use (HCV 83%; IDDM 93%; LMWH 84%).

Discussion — Information concerning use of safety boxes for disposal of injection material should be provided to patients in order to comply with regulatory recommendations on proper disposal of used injection material. Moreover, the habit of recapping needles (89% of all patients in this study) is still widespread.

RÉSUMÉ

Devenir du matériel d’injection utilisé lors du traitement de l’hépatite virale C en région Centre, en comparaison avec le diabète insulino-dépendant et la maladie thrombo-embolique


L’enquête réalisée en 1999 en région Provence-Alpes-Côte d’Azur montrait que 38 % des malades atteints d’hépatite virale C (HVC) traités à domicile par injections d’interféron se disaient informés des recommandations pour l’élimination du matériel injectable et que 41 % des aiguilles étaient jetées à la poubelle après injection. Le but de notre étude était d’apprécier, en région Centre, le devenir du matériel injectable à domicile dans le traitement de l’HVC, par comparaison au diabète insulino-dépendant (DID) et au traitement par héparine de bas-poids moléculaire (HBPM). Un auto-questionnaire a été proposé à chaque malade traité par un des hépato-gastroentérologues du réseau hépatite C de la région Centre lors de sa consultation de suivi thérapeutique du 1er octobre 2001 à janvier 2002 (N = 113) et de mars à juin 2002 dans les groupes DID (N = 85) et HBPM (N = 23). Les malades du groupe HVC se sont déclarés significativement plus souvent informés des recommandations pour l’élimination du matériel (89 %) que ceux des groupes DID (67 %) ou HBPM (26 %) (P < 0,01). Le matériel injectable était significativement moins souvent jeté à la poubelle dans le groupe HVC (6 %) que dans le groupe DID (32 %) ou HBPM (29 %) (P < 0,001). La boîte spécifique destinée à la collecte avant incinération dans le groupe HVC (73 %) ou DID (63 %) que dans le groupe HBPM (14 %). Cette boîte spécifique était significativement plus souvent jetée à la poubelle dans le groupe DID (54 %) ou HBPM (50 %) que dans le groupe HVC (0 %) (p < 0,001). En revanche, les malades des trois groupes décla-raient très majoritairement que l’aiguille était recapuchonnée après utilisa-tion (HVC : 83 %, DID : 93 %, HBPM : 84 %). En conclusion, une information systématique sur la mise à disposition d’une boîte spécifique et son recueil ultérieur devraient permettre de rendre effectives les recommandations légales sur l’élimination du matériel injectable usagé. En revanche l’habitude de recapuchonner les aiguilles (89 % tous groupes confondus) reste très répandue.

Introduction

A prospective survey conducted in the Provence-Alpes-Côte d’Azur region in France during the last three months of 1999 [1] showed that among 108 patients treated for chronic hepatitis C virus (HCV) infection, only 38% remembered having received information on proper disposal of used injection material and only 32% had received safety boxes for collecting used needles. Needles were discarded with household garbage by 41% of the patients. Seven accidental needle pricks were recorded (6.5% of patients), most occurring when recapping the needle.

The main objective of this prospective study was to investigate the information received by HCV patients in the Centre region in France on disposal of injection material and the outcome of such material including boxes for needle disposal. The secondary objective was to compare the findings with similar data from patients injecting insulin for insulin-dependent diabe-
tes mellitus (IDDM) or low-molecular-weight heparin (LMWH) for the prevention of thromboembolism.

Material and methods

Patient selection

HCV-positive patients attending follow-up consultations in the cities of Blois, Bourges, Chartes, Châteauroux, Orléans, and Tours from October 2001 to January 2002 were eligible for inclusion. The inclusion period was calculated to allow inclusion of at least 100 patients. In order to avoid difficulties from the learning period for self-administered injections, patients had to have started their treatment at least one month before inclusion in the study.

The control group was composed of patients receiving injections in their home, mainly by self-administration, for a non-contagious condition, IDDM. The treatment had to have started at least one month before inclusion to avoid including patients in a learning period and less than one year before inclusion to avoid both longstanding habits and an overly long period since first receiving instructions concerning the injection procedure. Data were collected from March to June 2002.

A second control group was constituted of patients receiving injections in their home for a condition which was neither chronic nor likely to last over a long period since first receiving instructions concerning the injection procedure. The person performing the injections at the time of the survey was detailed in table II. The injecting person was more often a family caregiver in the LMWH group, the first injection was performed in their home for eleven patients (48%), in the day hospital for six (26%), in a general practitioner’s practice for four (17%) and during a hospital consultation for two (9%).

A self-administered questionnaire was given to each patient in the HCV group during a consultation for therapeutic follow-up. The patient filled in the questionnaire in the waiting room and gave the completed questionnaire to the secretary. For the IDDM group, most of the questionnaires were also completed in the waiting room when patients consulted their diabetes specialist practicing in various hospital and clinics in the cities of Blois, Bourges, Chartes, Châteauroux, Orléans, and Tours. For the LMWH group, the patients gave the questionnaire to their primary care physician during a home visit.

Data regarding demographic characteristics (age, gender), treatment (first or renewed), information at the time of the first prescription (received or not, quality, oral or written, person delivering the information), the person performing the injections at the time the questionnaire (qualified nurse, patient, family relative/caregiver), mode of material disposal (injecting physician, pharmacy, medical laboratory or centre, household waste), needle recappping or not after use, and any accidental needle pricks were collected.

Statistical analysis

For each study variable, means were compared between the three groups using the non-parametric Kruskall-Wallis and exact Fischer tests.

Results

Patient characteristics

The HCV group included 113 patients, the IDDM group 85 patients, and the LMWH group 23 patients. Less than 3% of the patients did not respond to the questionnaire and their reasons for not responding were not recorded.

Information received by patients

The majority of patients in the HCV group (89%) stated they had received information concerning material disposal; this percentage was higher than in the IDDM group (67%) or the LMWH group (26%) (P < 0.01) (table III). Patients in the HCV group (43%) stated they had received written information more often than patients in the IDDM group (11%) or the LMWH group (0%) (P < 0.001) (table III). Information was generally delivered by a nurse [HCV group (70%), IDDM group (90%), LMWH group (71%)], but the prescribing physician delivered the information more often in the HCV group (61% versus 21% in the IDDM group and 14% in the LMWH group, P < 0.001). The primary care physician was implicated more often in the LMWH group (43% versus 3% for the HCV group and 5% for the IDDM group, P < 0.001).

The information received was considered to be clear by 94% of patients in the HCV group, 91% in the IDDM group and 66% in the LMWH group and was considered sufficient by 92%, 89%, and 60% of the patients, respectively.

Disposal of injection material

A significantly smaller number of patients in the HCV group (6%) disposed of the injection material with household waste compared to the IDDM (32%) and LMWH (26%) groups (P < 0.001) (table IV). While a safety box delivered to patients was often used in the HCV and IDDM groups, and was often collected and disposed of by the nurse in the LMWH group.
Table I. – Demographic characteristics of the study populations.
Caractéristiques démographiques des malades.

<table>
<thead>
<tr>
<th></th>
<th>HCV N = 113</th>
<th>IDDM N = 85</th>
<th>LMWH N = 23</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex ratio M/F</td>
<td>68/45</td>
<td>43/42</td>
<td>6/17</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Median age (range) (years)</td>
<td>44 (25 ; 75)</td>
<td>59 (18 ; 83)</td>
<td>64 (29 ; 91)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Table II. – Person performing the injections at the time of the survey.
Personne réalisant les injections au moment de l’enquête.

<table>
<thead>
<tr>
<th></th>
<th>HCV N = 113 (%)</th>
<th>IDDM N = 85 (%)</th>
<th>LMWH N = 23 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient</td>
<td>68 (60)</td>
<td>74 (87)</td>
<td>2 (9)</td>
</tr>
<tr>
<td>Nurse</td>
<td>29 (26)</td>
<td>2 (2)</td>
<td>18 (78)</td>
</tr>
<tr>
<td>Family caregiver</td>
<td>9 (8)</td>
<td>0 (0)</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Several other persons</td>
<td>7 (6)</td>
<td>9 (11)</td>
<td>2 (9)</td>
</tr>
</tbody>
</table>

Overall test: P < 0.001

Table III. – Information patients.
Information des malades.

Were you informed before starting treatment about disposal of used injection material?

<table>
<thead>
<tr>
<th></th>
<th>HCV N = 113 (%)</th>
<th>IDDM N = 85 (%)</th>
<th>LMWH N = 23 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>101 (89)</td>
<td>57 (67)</td>
<td>6 (26)</td>
</tr>
</tbody>
</table>

P < 0.01

Who delivered the information before starting treatment (several answers possible)?

<table>
<thead>
<tr>
<th></th>
<th>HCV N = 113 (%)</th>
<th>IDDM N = 85 (%)</th>
<th>LMWH N = 23 (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital nurse</td>
<td>63 (62)</td>
<td>42 (74)</td>
<td>1 (14)</td>
<td>0.007</td>
</tr>
<tr>
<td>Private nurse</td>
<td>8 (8)</td>
<td>9 (16)</td>
<td>4 (57)</td>
<td>0.001</td>
</tr>
<tr>
<td>Prescribing physician</td>
<td>62 (61)</td>
<td>12 (21)</td>
<td>1 (14)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Primary care physician</td>
<td>3 (3)</td>
<td>3 (5)</td>
<td>3 (43)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>8 (8)</td>
<td>3 (5)</td>
<td>0</td>
<td>0.634</td>
</tr>
</tbody>
</table>

Who was this information delivered before starting treatment?

<table>
<thead>
<tr>
<th></th>
<th>HCV N = 113 (%)</th>
<th>IDDM N = 85 (%)</th>
<th>LMWH N = 23 (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>94 (94)</td>
<td>55 (98)</td>
<td>6 (100)</td>
<td>0.297</td>
</tr>
<tr>
<td>Written document</td>
<td>43 (43)</td>
<td>6 (11)</td>
<td>0</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

HCV group, patients who stated they had not received information on disposal of used material more often discarded needles in the household compared to those who stated they had been informed (43% versus 27%, P < 0.05). Self-injecting HCV patients also disposed of used material more often with household waste (44% versus 29% of patients whose injection was performed by another person, P < 0.05). The same was true for patients in the IDDM group (37% versus 0%, P < 0.05). In the LMWH group, none of the studied variables was significantly linked with the mode of material disposal.
The six patients in the HCV group who disposed of their used material in the household waste were men, median age 40 years. Two had had prior treatment. All had a daily injection of PEG-INF; four were self-injectors. A nurse or a family relative/caregiver performed the injections for the two others. Treatment was started at home in four, at the day care hospital in one and during a hospital consultation in one. Only two of these six patients stated they had received information concerning disposal of used material at the time of the first injection.

Disposal of safety boxes

The way the safety boxes were disposed of is detailed in table V. For 57% of the patients in the IDDM group, the safety box was thrown out with the household waste. This figure was 50% in the LMWH group and 0% in the HCV group.

Needle recapping

Needle recapping was a widespread practice in all three groups of patients, including those receiving an injection performed by a nurse (table VI). In the HCV group, five accidental needle pricks were noted; two during self-administration, one after injection by a nurse and one after injection by a family relative/caregiver. Systematic surveillance did not reveal any cases of contamination. Three accidental needle pricks were observed in the IDDM group, all concerning self-injections, and none in the LWMH group.

Discussion

In their report, Ouzan et al. [1] emphasized the insufficient disposal of used material during ambulatory treatment of HCV infection in the PACA region in south-eastern France. PEG-INF has become available [2, 3] and the quantity of used injection material has decreased (1 injection/week for 24 to 48 weeks), the risk of accidental needle pricks, is not fully eliminated either at the time of the injection or after inappropriate disposal of the used needle. The advent of widespread treatment of HCV-HIV co-infections has also accentuated the risk [4].

Our survey was conducted after the work by Ouzan et al. [1] triggered awareness of the problem in our region. Our work tends to demonstrate the importance of active participation by patients, prescribing physicians, nurses knowledgeable about
patient education, pharmacies and medical laboratories agreeing to dispose of used material appropriately, and manufacturers who supply safety boxes for disposal of used injection material. Active participation of all healthcare partners should significantly improve the quality of material collection in the patients’ homes and considerably reduce the amount of such material in household garbage. Our data collection method, using a self-administered questionnaire, probably favored better results, patients not using good practices preferring to abstain from responding or giving what they imagined were the "right" answers. It should be noted however that the patients accepted the study quite well. There were some differences in the results of the present study compared to the previous study using the same methodology in the PACA region [1]. In the present study, only those patients participating in our treatment network were asked to participate; this does not include all patients treated in our region. The epidemiological data we collected do however allow us to estimate that 80% of the patients treated in the Centre region were included in the survey. The fact that two-thirds of our patients had started their treatment in the day care hospital setting certainly improved the results due to information delivered in these centers concerning the disposable of used injection material. It is of utmost importance to provide patients with easy-to-understand information at the time of the first injection. A visit to the day care hospital assures that the information is delivered twice (by the prescribing physician, then by the nurse) and enables centralized distribution of safety boxes so no one is forgotten. Examining the data from the six patients in the HCV group who disposed of their needles with household waste suggests that information is received less well when the treatment is initiated in the home setting.

The results from the diabetes patients were relatively mediocre, probably in relation with the chronic nature of the disease. Patients with HCV infection have to be concerned about collecting used material for only a short time whereas diabetic patients need to provide a long-term effort. We have not found any comparable data in the literature concerning disposal of self-injection material in diabetic patients.

The heterogeneous results observed in this regional survey suggest the need for better standardization of the home disposal system for material with a potential infectious risk (mainly used injection material). PEG-INF should not be prescribed without delivery of information on disposal of used injection material and collection of safety boxes. The pharmaceutical industry currently provides these safety boxes to frequent prescribers identified by their sales representatives. Our survey shows that all treated patients have not received disposal boxes and that those who did not have boxes used plastic bottles which are not as solid or safe. Who will finance the boxes when generic IFN becomes available? Wouldn’t it be advisable to clarify this point so the pharmacy automatically dispenses a box adapted to the size of the prescribed material? A package of one new injectable anti-HIV agent includes both the therapeutic product to inject and a disposal container. It would be advisable to use the same system for anti-HCV agents. These containers can be prescribed and dispensed by pharmacies. Prescribers are insufficiently aware of this possibility. Our study emphasises the importance of an information leaflet, although it is difficult to distinguish between its effect and double information (delivered in our study by the physician and a specially trained nurse). For most of the patients in our study, double information was delivered at the time of the first treatment in the day care hospital. It would certainly be possible to organize double information in out-patient setting in units with a consultation nurse present during medical consultations. Care networks should undertake a cost-effectiveness analysis for these two solutions. Another critical point is to determine who should bear the cost of collecting and incinerating used injection material. Clearly, when the injection is performed during a home visit or during a consultation, the nurse or physician who perform the injection should dispose of the used material [5, 6] and the cost would then be born by the health care professional. The situation is less clear for self-injections. The prescriber is legally responsible, in terms of civil law and perhaps in terms of penal law [6]. But when the initial prescriber does not see the patient for 3, 6 or 12 months and intermediary consultations are conducted by the primary care physician, who is responsible? Who should collect the used material? Our survey shows that most of the collection is done by the hospital pharmacy of the initial prescriber, sometimes by a private dispansary, and sometimes by a medical laboratory generally used by the patient. Our survey shows that certain dispensaries or medical laboratories have refused to these containers. Besides the problem of financing incineration, current regulations require a specific area for stocking waste material [7]. Most of the private dispensaries do not have such a facility. Regulations now require the generators of disposable material to trace all operations used to eliminate material with an infectious risk [7, 8]. However, when the injection is delegated to the patient, it is difficult for the prescriber to control this traceability. Finally, the rules for transportation and incineration of waste material with an infectious risk have been recently detailed [9, 10].

Municipal authorities might also become involved, providing safe containers, similar to those used for the collection of glass waste. Such public containers could be placed in specific areas and emptied regularly for incineration. The advantage of this kind of system is to offer a solution for all types of injection material used in the patients’ homes. In our study, the IDDM and LMWH groups generated one-third of the needles going into domestic waste, demonstrating that the problem goes well beyond HCV infection. The prevalence of viral infections and other contagious diseases in these populations is probably at least equivalent to that in the general population. It is probably higher in diabetics who have long-term treatment. Awareness of the problem must be improved among health care professionals so that the effort required to achieve appropriate disposal is not made solely by those who are particularly motivated. Since the general population is currently invited to participate in selective sorting of household waste, it might be advisable to call upon the (valid) patient's responsibility to achieve exhaustive collection of used injection material in a safety box dispensed at the same time as the injection product, and its transportation to a specific municipal collection container. This would of course still be the responsibility of nurses when the patient is invalid or unable to perform self-injections.

Our survey revealed that 9% of the injections in patients treated for HCV infection are performed by a family caregiver. This was not observed in the IDDM or LMWH groups despite the contagious nature of HCV infection. This finding discloses defective transmission of information. Family caregivers should be discouraged to perform injections for patients with a contagious disease, with the corollary problem of self-injections, but it is highly unlikely that this practice will be abandoned due to the lack of nurses and sufficient financing. Only those patients who are strongly motivated and who have assimilated the information on self-injection and collection of used material should be allowed to use this method. Providing this information and discerning which patients are concerned takes time, which is not sufficiently available in current practice.

Our questionnaire revealed retrospectively three accidental needle pricks in attending persons (two nurses and one familial caregiver) For several accidents, follow-up consultation and screening were not performed. Specific information concerning the measures to be taken in the event of an accidental needle prick should also be given at the time of the first home injection.

Before safety boxes for used injection material became available and incineration circuits were organized, nurses were taught to recap needles to limit the risk of subsequent infection. Our
study showed that this practice persists. It also demonstrated that most of the accidental needle pricks occurred during recapping. Specific education on abandoning the practice of recapping and immediate disposal of used injection material in a safety box must be reinforced. We are currently conducting a second survey to determine the impact of information on this practice.

It is certainly the responsibility of the hepatitis C network to attempt to improve practices for the disposable of used injection material employed for ambulatory treatment of HCV infection. Our study showed that this problem concerns all injections performed in the patients’ homes, particularly self-injections. If the public authorities want to limit the risk of accidental needle pricks with used injection material in patients’ homes, the participation of health care professionals in information delivery and used material collection must be encouraged. It would also be necessary to help patients assume certain responsibilities and facilitate their participation in collection by making specific collection containers available for the general public.

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REFERENCES


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