

¹ *Addiction Research Institute, Zürich*² *Institute for Social and Preventive Medicine, University of Zürich*

Decreasing intravenous cocaine use in opiate users treated with prescribed heroin

Summary

Decreasing intravenous cocaine use in opiate users treated with prescribed heroin

Objectives: Providing maintenance treatment for heroin users who also use cocaine presents special problems. Poly-drug use is prevalent among clients in the Swiss Program for the Medical Prescription of Heroin (1994–1996).

Methods: A formative evaluation examines whether cocaine use was associated with a higher drop-out rate from treatment, and how cocaine use changed among those who remained in treatment. Frequency of cocaine use before and during treatment was measured by self-report every six months and by urinalysis every two months.

Results: There was no significant difference between the drop-out rates for cocaine users vs. non-users ($n = 995$). A significant reduction in cocaine use over an 18-month period from 84 to 48% was found for a sample of clients ($n = 266$). Overall retention in programme was high and also the prevalence of factors associated with cocaine use such as criminality, prostitution and contact with the drug scene decreased.

Conclusions: The results suggest that prescribed heroin maintenance provides a treatment context that may help reduce consumption of other illicit drugs such as cocaine.

Keywords: Addiction – Cocaine – Prescribed heroine – Maintenance – Switzerland – Treatment.

There are particular problems providing successful maintenance treatment for heroin users who are also using cocaine. Reducing on-going cocaine use is important because of its association with drug-scene contacts, criminal behaviour, injection-related health hazards, and risky sexual behaviour (Condelli et al. 1991; Desjarlais et al. 1992; Raschke 1994; Rawson et al. 1994; Schoenbaum et al. 1989). This paper focuses on cocaine use among opiate users treated with prescribed heroin in the Swiss Program for the Medical Prescription of Narcotics (PROjekte für eine ärztliche Verschreibung von Betäubungsmitteln PROVE).

Opiate maintenance has become a widespread treatment option for heroin users in Switzerland. While less than 900 patients were treated with oral methadone in 1982, this figure rose to almost 14 000 in 1994 among an estimated number of 30 000 regular users of heroin and/or cocaine (Rehm 1995). Despite of several well-designed therapy options available, many opiate users with more severe social and medical problems failed to profit from treatment and remained objects of public concern.

Against this background, the Swiss government launched a research project on heroin maintenance therapy for opiate users who are difficult to reach by existing treatment options (Rihs-Middel 1997). The purpose of PROVE was to study the feasibility, safety, and effectiveness of heroin maintenance treatment among a group of chronic users who had previously failed other forms of treatment.

The project has produced a series of investigations: feasibility (Uchtenhagen et al. 1996), economic benefits (Frei et al. 1998), impact on criminal behaviour (Killias and Rabasa 1997), a randomised trial on the comparison with methadone with a waiting-list design (Perneger et al. 1998), and a field study comparing methadone and heroin maintenance (Dobler-Mikola et al. 1998). For an overview see (Uchtenhagen et al. 1999).

The pre-existing research on heroin maintenance did not address the problem of cocaine use. A British team compared injectable heroin with oral methadone for maintenance treatment in 1980 (Hartnoll et al. 1980). They found better retention for the heroin group but similar outcome for remaining patients in both groups. Cocaine use was of minor importance in that study. Since the patients and context were quite different from the Swiss situation, the British results were of limited use in determining whether heroin maintenance would complement existing treatment options for chronic opiate users in Switzerland.

While methadone maintenance has been shown to be effective in reducing illicit opiate use (Ball and Ross 1991), its impact on cocaine use has been equivocal and controversial. While some authors suggest methadone might be a protective factor against cocaine use (Des Jarlais et al. 1992; Verthein et al. 1996), others however found methadone to be ineffective regarding cocaine use (Avants et al. 1994; Condelli et al. 1991; Kosten et al. 1987).

In a literature review on cocaine use by patients in methadone maintenance, Condelli et al. (1991) observed that methadone alone did not appear to reduce cocaine use. They also analysed three papers that specifically evaluated the effectiveness of behavioral interventions for cocaine use among patients in methadone maintenance programmes. While all reviewed papers reported a reduction in cocaine use, the conclusion was that “the small sample sizes and high or unknown attrition rates of these studies leave it unclear to what extent their findings were due to the interventions or to selective dropout from the program”.

Another team observed cocaine use in a group of 398 patients in methadone maintenance at baseline and after 18 months of treatment. The 30-day prevalence for cocaine use was 51% at baseline and 53% at follow-up. This was mainly due to an increase in crack cocaine use from 29 to 41%, whereas powder cocaine alone and in “speedballs” (a cocaine and heroin combination) decreased slightly from 31 to 23%, and from 24 to 20%, respectively (Grella et al. 1997).

It is indispensable to have confounding factors and the possible selection effect controlled to see if a treatment like methadone maintenance also reduces cocaine use. One important co-factor has been identified. A controlled study showed that methadone maintenance is effective in reducing both illicit opiate and cocaine use when basic counselling is provided as part of the treatment package. Even better results were achieved when on-site professional services for medical and social problems were offered in addition to standard counselling (McLellan et al. 1993).

Assessing cocaine use in evaluation studies is commonly done by self-reports and urinalysis. In a broad review the validity of self-reports in different settings for several substances was compared (Magura and Kang 1996). They calculated conditional kappa, a measure that gives information on whether the agreement of self-reports with positive lab results is greater than pure chance (Bishop et al. 1995). A negative urinalysis does not mean that cocaine had not been used in some days prior, therefore agreement is only tested for those with positive results. Even though the reviewers were not satisfied with the validity, they concluded that false reporting might lead to underestimating the effects of treatment because of more false negative reporting before than after treatment (Magura and Kang 1996).

This paper aims to answer the following questions:

1. How valid was self-reported cocaine use in PROVE?
2. Was there a reduction in cocaine use among those who remained in treatment over 18 months?
3. Which factors are associated with continued cocaine use?
4. Was cocaine use before treatment a possible risk factor for early drop-out?

The answers to these questions will contribute to the discussion about heroin prescription as a complement of the treatment offers for opiate users.

Methods

Study design

The Program for a Medical Prescription of Narcotics (PROVE) was mainly a cohort study comparing baseline with follow-up data of participants in a naturalistic setting. Included was a series of clinical trials on smaller subsamples over a limited period of time (Uchtenhagen et al. 1996; Uchtenhagen et al. 1999).

Approval was obtained from the Swiss Academy of Medical Sciences' supra-regional ethics committee. A safety assurance group monitored the ongoing medical therapy.

Participants

From 1994 to 1995 995 patients were admitted to heroin assisted maintenance treatment in the frame of PROVE.

The main analysis is based on data for 266 patients who participated in PROVE at least during 18 months in the period of January 1 1994 to December 31 1996. After that period follow-up-interviews were stopped, therefore some 486 patients do not have an 18-months-follow-up (right hand censored) and are excluded from the analysis.

All clients had to meet the following admission criteria to the programme: Minimum age of 20 years; addicted to heroin for at least 2 years; at least two prior attempts to treat the addiction without success; informed consent⁸.

Expulsion criteria mainly were the following: Dealing in the treatment centre; smuggling of substances (e.g., mixing the prescribed heroin with illicit cocaine or selling prescribed substances to non-participants); violent behavior; non-compliance with treatment or research guidelines

Continued use of illicit substances was not a criterion for expulsion from the programme.

Assessments

Due to the relative novelty of the project the methodology was formative evaluation with comprehensive data collection. Trained independent interviewers conducted interviews at intake and every 6 months during treatment. The standardised questionnaires were compatible with the EuropASI (Blanken et al. 1994), except the questions on drug use covered the six-month prevalence rather than the 30-day prevalence.

The questionnaires included a sample of 62 items from the SCL-90 Symptoms Checklist (Derogatis 1997), excluding the somatic items.

Urine tests were gathered at intake and then randomly on an average bi-monthly basis without previous notice. The test results were not linked with any contingencies. Medical examinations including serological testing for HIV (with consent) and hepatitis were done at intake and then every six months according to the research protocol.

For patients who left treatment, the participating clinics had to fill in a questionnaire, explaining the reasons for leaving. This information was collected for departing participants through 1997, a longer period than the one covered by the main study. Those who left the programme for either methadone maintenance or detoxification were not considered to be drop-outs.

The prescriptions, the exact dosages, time and way of administration of opioids as well as of other medications like antidepressiva and benzodiazepines were recorded in each clinic using a computer-based system CDDD[®]. The researchers exported the data to SPSS[®] for statistical analysis.

Treatment

The prescription of narcotics is seen as an adjunct to psychosocial rehabilitation. Therefore, patients were offered comprehensive psychosocial and medical care within the framework of heroin-maintenance treatment. In fact, participation in psychosocial counselling or therapy was mandatory. If a client arrived with pre-established therapeutic or coun-

selling contact, the centres cooperated with the other facilities in question. The intensity of psychosocial care was measured as the number of consultations during 6 months in treatment.

The prescribed narcotics were heroin, morphine, and methadone for oral and intravenous application. All patients described here received prescribed heroin. The mean dosage of prescribed injectable heroin was 479 mg (SD = 193.4) per day. The patients had to come to the centre two or three times a day to inject under the supervision of trained staff. Other than injectable narcotics, methadone and morphium were prescribed as take-home substances on weekends, holidays, or if demanded by a job setting.

Statistical analyses

Conditional kappa (Magura and Kang 1996; Bishop et al. 1995) was computed for the validity of self-reports. Chi-square tests were used for differences between groups. Phi and Cramers V were given as measures of effect size. Non-parametric tests were used in order to analyze individual change over time: McNemar's test for dichotomous variables and Wilcoxon's signed-ranks test for ordinal-scaled variables. Spearman's correlation coefficient was computed for relations between ordinal-scaled variables such as frequency of drug use and interval-scaled variables such as age. A probability of error of $p = 5\%$ was considered statistically significant.

A Kaplan-Meier survival analysis with log rank test was computed to determine if the three groups (non-users, occasional users, and daily cocaine users at intake) were different from each other regarding their dropout rates.

Three psychiatric syndromes, i.e., aggressive behaviour, anxiety, and depression were extracted by factor analysis from the 62 psychiatric items in the SCL-90. The SPSS[®] statistical software version six was used for calculations (SPSS 1994).

Results

Baseline

The study sample ($n = 266$) consisted of 98 (37%) female and 168 male participants. The mean age was 30 years (SD = 5.6 years), the mean duration of regular use of heroin was 10 years (SD = 5.0 years), and the mean duration of regular use of cocaine was seven years (SD = 4.6 years). Heroin maintenance treatment was offered in six clinics in Zurich (two clinics), Bern, Olten, Thun, and Basel.

Only 16% of the sample reported no cocaine use during the six months prior to the first interview and had no positive urinalysis before intake. The preferred application of both

Table 1 Characteristics of participants by frequency of cocaine use at intake (row percentages, n = 266)

| Characteristics at intake | Total n = 266 | 79 daily users | 143 occasional users | 41 non-users | missings | Spearman | Cramers V | p |
|---|---------------|----------------|----------------------|--------------|----------|----------|-----------|-------|
| Gender | | | | | 3 | | 0.12 | n.s. |
| Female | 37 % | 46 % | 33 % | 34 % | | | | |
| Male | 63 % | 54 % | 67 % | 66 % | | | | |
| Age (mean, SD) | | 30.4 (5.7) | 30.5 (5.5) | 29.9 (5.6) | 0 | 0.02 | | n.s. |
| Duration of regular use of heroin and/or cocaine (mean, SD) | | 10.3 (4.9) | 9.5 (4.6) | 10.3 (5.6) | 1 | 0.04 | | n.s. |
| Clinic in | | | | | 3 | | 0.20 | <.01 |
| Zurich | 30 % | 44 % | 24 % | 27 % | | | | |
| Other than Zurich | 70 % | 56 % | 76 % | 73 % | | | | |
| Illegal source of income last 6 months | | | | | 4 | | 0.24 | <.001 |
| Yes | 63 % | 77 % | 61 % | 42 % | | | | |
| No | 37 % | 23 % | 39 % | 59 % | | | | |
| Income from a job last 6 months | | | | | 4 | | 0.15 | n.s. |
| Yes | 42 % | 32 % | 46 % | 51 % | | | | |
| No | 58 % | 68 % | 54 % | 49 % | | | | |
| Commercial sex worker (ever) | | | | | 7 | | 0.23 | <.01 |
| Yes | 32 % | 47 % | 23 % | 33 % | | | | |
| No | 68 % | 53 % | 77 % | 68 % | | | | |
| Frequency of contact with the drug scene last 6 months | | | | | 7 | | 0.28 | <.001 |
| 21 to 30 days per month | 32 % | 51 % | 25 % | 22 % | | | | |
| 8 to 20 days per month | 26 % | 32 % | 25 % | 15 % | | | | |
| 1 to 7 days per month | 29 % | 14 % | 36 % | 32 % | | | | |
| None | 14 % | 3 % | 14 % | 32 % | | | | |
| Depression symptoms last month | | | | | 4 | | 0.12 | n.s. |
| factor high | 32 % | 39 % | 27 % | 34 % | | | | |
| factor middle | 35 % | 39 % | 35 % | 29 % | | | | |
| factor low | 33 % | 22 % | 39 % | 37 % | | | | |
| Anxiety symptoms last month | | | | | 4 | | 0.08 | n.s. |
| factor high | 32 % | 38 % | 28 % | 37 % | | | | |
| factor middle | 35 % | 29 % | 39 % | 32 % | | | | |
| factor low | 33 % | 33 % | 34 % | 32 % | | | | |
| Aggressive symptoms last month | | | | | 4 | | 0.07 | n.s. |
| factor high | 29 % | 32 % | 26 % | 37 % | | | | |
| factor middle | 40 % | 38 % | 43 % | 32 % | | | | |
| factor low | 31 % | 30 % | 31 % | 32 % | | | | |
| Hepatitis B | | | | | 63 | | 0.26 | <.001 |
| positive | 72 % | 81 % | 74 % | 45 % | | | | |
| negative | 28 % | 19 % | 26 % | 55 % | | | | |
| Hepatitis C | | | | | 74 | | 0.02 | n.s. |
| positive | 80 % | 80 % | 80 % | 78 % | | | | |
| negative | 20 % | 20 % | 20 % | 22 % | | | | |
| HIV | | | | | 36 | | 0.11 | n.s. |
| positive | 11 % | 16 % | 9 % | 8 % | | | | |
| negative | 89 % | 84 % | 91 % | 92 % | | | | |

heroin and cocaine was injection, which was practiced by 75% of the sample. 90% of those 222 with cocaine use reported intravenous use. Alcohol use was prevalent with 33% drinking an average of 30 g pure alcohol per day or more. Only 46% reported no illicit use of benzodiazepines, and 23% used no cannabis.

With regard to the self-reported use and the urinalysis before intake, 79 participants (31%) reported a daily or nearly daily cocaine use during the six months prior the first interview at intake, the majority 134 (52%) used cocaine occasionally, and 46 (18%) reported no cocaine use. There was no self-report available for seven cases, but on the basis of their urinalysis two of them were coded as occasional and another two were coded as non-users. Three cases have missing data on cocaine use. Of the 46 patients reporting no use, 7 (15%) had a positive urinalysis for cocaine before admission, and were hence regarded as occasional users. The measure for the validity of the self-reports when only those with a positive urinalysis are considered was conditional kappa = 0.66. From 61 patients, no urine specimens were collected before intake. The reporting non-users were slightly more likely to be tested than the users.

Hence for the further analysis 79 (31%) were regarded as daily users, 143 (54%) occasional users, and 41 (16%) non-users of cocaine at intake.

Table 1 also shows social and health characteristics of the patients at intake related to their frequency of cocaine use. Though not significantly, those who consumed cocaine more frequently tended to be women. They were significantly more prone to live in Zurich, to have illegal income, to prostitute themselves and to visit the drug scene frequently.

Though the difference was not significant, those with high or medium levels of depression symptoms were more likely to report daily cocaine use. A slightly higher daily cocaine use was reported by patients with a high level of anxiety symptoms.

Infection rates for hepatitis B differed significantly by frequency of cocaine use but not for hepatitis C. There was a tendency for higher rate of HIV infections among those with daily cocaine use.

Follow-up at 18 months

In Table 2 the results of self-reports and urinalysis for cocaine during the 6 months preceding the follow-up interview are cross tabulated. Both measures showed a majority of non-users (54% and 75%). Among the 114 participants who reported cocaine use, 99 consumed occasionally, and 15 daily or nearly daily.

The comparisons of self-reported use with the urinalysis at follow-up showed a somewhat better validity than at baseline. The conditional kappa was 0.82 for those with positive results in the 6 months before the follow-up interview. A smaller portion (5% of 133) of those reporting no use had a cocaine positive test than before intake (19% of 37).

Of those 114 participants who reported any cocaine use, 59 (52%) had only non-positive results in the six-month period preceding the interview. As this finding is mainly due to the different time frames covered by the two measures it does not influence the calculation of conditional kappa = 0.82 directly.

Those participants with conflicting negative self-reports or no self-reports, and positive test results for cocaine were coded as occasional users. The combination of the two measures resulted in two missing cases, 15 (6%) with daily (or nearly daily) cocaine use, 111 (42%) occasional users, and 138 (52%) non-users at the 18 month follow-up.

Observations related to continued cocaine use

After one and a half years of treatment with prescribed heroin the six-month-prevalence of cocaine use decreased from 84 to 48% (Tab. 3). The proportion of the daily users sank from 30 to 6%, while the non-users increased from 16 to 52%. The majority of those who continued illicit cocaine use reduced their frequency to occasional use. We were interested in finding indicators at baseline associated with the frequency of use at follow-up and how the treatment could influence the use of cocaine.

The characteristics at intake that might be relevant and their relation to the frequency of cocaine use between the 12th and the 18th month of treatment were analysed.

Table 2 Self-reports and urinalysis for cocaine before the follow-up interview at 18 months (n = 247, md = 19)

| Cocaine use at T4 | Urine cocaine negative only | | | One or more urine cocaine positive | | | Total |
|------------------------|-----------------------------|---------|-------|------------------------------------|---------|-------|--------------------|
| | n | Total % | row % | n | Total % | row % | |
| Self reported negative | 127 | 51 % | 95 % | 6 | 2 % | 5 % | 133 (54 %) |
| Self reported positive | 59 | 24 % | 52 % | 55 | 22 % | 48 % | 114 (46 %) |
| Total | 186 | 75 % | | 61 | 25 % | | 247 |
| | | | | | | | cond. Kappa = 0.82 |

Table 3 Individual change of self-reported or lab-confirmed cocaine use between intake and 18 months follow-up (n = 261, md = 5)

| | Daily users at 18 months follow-up | Occasional users at 18 months follow-up | Non users at 18 months follow-up | Total |
|----------------------------|------------------------------------|---|----------------------------------|------------|
| Daily users at intake | 10 | 41 | 28 | 79 (30%) |
| Occasional users at intake | 5 | 58 | 78 | 141 (54%) |
| Non users at intake | 0 | 10 | 31 | 41 (16%) |
| Total | 15 (6%) | 109 (42%) | 137 (52%) | 261 (100%) |

Wilcoxon Matched Pairs Signed-Ranks Test: $Z = -9.35$, $p < 0.001$.

Table 4 Characteristics at follow-up and frequency of cocaine use before follow-up interview at 18 months (row percentages, n = 266)

| Characteristics at T4 follow-up 18 months | Total n = 266 | 15 daily users T4 | 111 occasional users T4 | 138 non-users T4 | missings | Cramers V | p |
|---|---------------|-------------------|-------------------------|------------------|----------|-----------|---------|
| Illegal income last 6 months | | | | | 2 | 0.35 | < 0.001 |
| Yes | 10% | 53% (8) | 9% | 7% | | | |
| No | 90% | 47% (7) | 91% | 94% | | | |
| Income from a job last 6 months | | | | | 2 | 0.15 | n.s. |
| Yes | 56% | 40% (6) | 65% | 52% | | | |
| No | 43% | 60% (9) | 35% | 48% | | | |
| Commercial sex work last 6 months | | | | | 2 | 0.29 | < 0.001 |
| Yes | 3% | 20% (3) | 4% | (0) | | | |
| No | 97% | 80% (12) | 96% | 100% | | | |
| Frequency of illicit heroin use last 6 months | | | | | 7 | 0.24 | < 0.001 |
| Daily | 6% | 7% (1) | 7% | 4% | | | |
| Occasional | 17% | 36% (5) | 29% | 6% | | | |
| None | 77% | 57% (8) | 64% | 90% | | | |
| Frequency of illicit benzodiazepine use last 6 months | | | | 16 | 0.18 | < 0.01 | |
| Daily | 6% | 20% (3) | 8% | 4% | | | |
| Occasional | 22% | 47% (7) | 26% | 17% | | | |
| None | 71% | 33% (5) | 67% | 79% | | | |
| Frequency of contacts with the drug scene last 6 months | | | | | 2 | 0.44 | <.001 |
| 21 to 30 days per month | 2% | 27% (4) | (0) | 1% | | | |
| 8 to 20 days per month | 8% | 20% (3) | 14% | 1% | | | |
| 1 to 7 days per month | 32% | 33% (5) | 50% | 17% | | | |
| None | 58% | 20% (3) | 36% | 80% | | | |
| Depression factor last month | | | | | 3 | 0.12 | n.s. |
| high | 23% | 27% (4) | 27% | 19% | | | |
| middle | 26% | 47% (7) | 25% | 24% | | | |
| low | 52% | 27% (4) | 48% | 57% | | | |
| Anxiety factor last month | | | | | 3 | 0.12 | n.s. |
| high | 22% | 47% (7) | 24% | 18% | | | |
| middle | 26% | 27% (4) | 26% | 26% | | | |
| low | 52% | 27% (4) | 50% | 56% | | | |
| Aggressive factor last month | | | | | 3 | 0.12 | n.s. |
| high | 20% | 27% (4) | 24% | 17% | | | |
| middle | 28% | 47% (7) | 30% | 25% | | | |
| low | 52% | 27% (4) | 46% | 59% | | | |

The frequency of visits of the drug scene before treatment was clearly related with the frequency of later cocaine use. Also those who used to inject both heroin and cocaine (mostly in cocktails) at intake showed a greater probability to continue cocaine use during treatment.

Treatment parameters like dosages of prescribed opiates, prescription of antidepressiva, and benzodiazepines as well

as the frequency of contacts for psychosocial care were not related with the frequency of cocaine use at follow-up.

A different picture for cocaine use emerged from the individual characteristics at follow-up (Tab. 4): illegal income, prostitution, illicit heroin use, benzodiazepine use, and contact with the drug scene were all significant correlates of cocaine use at follow-up. Among those 10% of the partici-

pants with illegal income at follow-up, two-thirds were engaged in cocaine use. Those seven who reported prostitution were all using cocaine. Illicit heroin and benzodiazepine use were also correlated with cocaine use. The strongest correlation was found between contact with the drug scene and cocaine use.

While nothing can be said about the direction of these associations, it is possible to have a look at the changes in the related behaviour between baseline and follow-up. All those variables associated with cocaine use like contact with the drug scene, prostitution, illegal income, illicit heroin, and benzodiazepine use decreased from relatively high levels before intake to moderate or low levels between the 12th and 18th month of treatment in heroin maintenance e.g., 164 or 63% reported illegal income in the six months before treatment (see Tab. 1) but only 27 or 10% did so after 18 months of treatment.

Possible selection effect?

After 18 months 71% of the patients were still in treatment. The dropout rate was 11%. The others left the programme for alternative treatment options. Although the dropout rate of the regular cocaine users tended to be higher, a Kaplan-Meier survival analysis showed no significant difference between the three groups (log rank: 2.70; df: 2; n.s.).

The group of non-users of cocaine at intake had 18 dropouts (11%) after a mean time of 373 days (SD = 251 days). Those with occasional use of cocaine had 57 dropouts (10%) after a mean time of 265 days (SD = 195 days). The group with daily use before intake had 34 dropouts (14%) after a mean time of 256 days (SD = 201 days).

Discussion

Both self-reported cocaine use and the results of the urinalysis showed a sharp decrease in the frequency of cocaine use while in treatment (84 to 48%). This was found in a cohort of 266 patients who were enrolled in heroin maintenance treatment for 18 months. Those who continued cocaine use failed to stay away from the drug scene. They often continued illicit heroin use as well as other criminal activities, undermining the success of treatment.

Overall retention in the programme was high. Although the daily cocaine users tended to drop out somewhat earlier from treatment, a survival analysis did not show any significant difference between the three groups. It is therefore very unlikely that the observed decrease of cocaine use is due to a selection effect.

The generalisability of these findings is limited to a subgroup of so-called "heavily dependent" and marginalised

long-term poly-drug users with multiple health and psychiatric problems. And the results must be seen in the light of the Swiss situation with a comprehensive treatment offer for drug users.

Another limitation is the validity of the measures for cocaine use. A comparison with the results of some studies with methadone maintenance patients showed good consistency between self-report and urinalysis. In a review of evaluation papers, conditional kappa was calculated for 24 reviewed studies. Conditional kappa measures the degree to which self-reports agree beyond chance with a positive urinalysis. A value of 1 indicates perfect agreement, and a value of 0 indicates chance agreement only. In the reviewed studies regarding cocaine use in methadone maintenance conditional kappa ranged between 0.31 and 0.88 (Magura and Kang 1996). The values found in the current study were 0.66 at intake and 0.82 after 18 months in treatment. Basically, we rely on self-reports, like most studies in this field, and these results indicate relatively good reliability, self-report is not 100% reliable.

The price for cocaine in Switzerland from 1994 to 1996 (Bundesamt für Polizeiwesen 1996; Bundesamt für Polizeiwesen 1997) remained relatively low. The cause for the impressive reduction of cocaine use must therefore rather be seen in the treatment than in external factors.

As for possible internal factors that could help explain behaviour change, high retention might play a crucial role. Heroin maintenance seems to avoid attrition among a difficult patient group with long histories of dependence and several failed treatment attempts.

It is also crucial to the understanding of the results of heroin prescription to emphasise the high demands and structure the setting exerts on patients. They have to show up at the treatment centres 2,6 times per day on average just to get their injectable heroin. As mentioned, counselling but also medical care are obligatory.

The prevalence of factors associated with cocaine use, such as criminality, prostitution, illicit heroin use, and contact with the drug scene also decreased, e.g., the proportion with illegal income dropped from 63 to 10%. Both at intake (Tab. 1), and at follow-up (Tab. 4), the associations between this socially undesirable behaviour and the frequency of cocaine use were high. It is unclear whether one follows the other or the process of dissociation from the drug subculture affects them all together.

Future research might focus on the effectiveness of the treatment components like dosage, prescription of antidepressiva or the intensity of psychosocial counselling.

However, we were able to show evidence of a highly significant reduction of intravenous cocaine use in patients in a

comprehensive treatment programme including the prescription of heroin. In this special setting there was a decrease in associated behaviour like prostitution, criminality, contact with the drug scene and illicit heroin use.

Acknowledgements

Above all, thanks go to our participants for responding to our questions and to the responsables and staff in the participating clinics for their help with data collection. A special thanks goes to Mark Rudin, Wim Nieuwenboom and Jen Wang for assistance with English. Stephan Christen and Wim Nieuwenboom gave valuable statistical advice. This study was funded by the Swiss Federal Office of Public Health (BAG).

Zusammenfassung

Reduktion des Kokainkonsums bei Heroinabhängigen in Heroin-gestützten Behandlungen

Fragestellung: Der Kokainkonsum von Heroinabhängigen in Substitutionsbehandlungen stellt besondere Probleme. Mehrfachabhängigkeit ist sehr häufig unter den Teilnehmenden der Heroin-gestützten Behandlungen in der Schweiz. Methoden: Mit Daten der Begleitevaluation wird hier untersucht, ob Kokainkonsum mit früheren Behandlungsabbrüchen einher ging und wie sich der Kokainkonsum reduziert hat bei denen, die in Behandlung geblieben sind. Die Häufigkeit des Konsums wurde in Interviews alle sechs Monate erfragt und anhand von zweimonatlichen Urinproben erhoben.

Resultate: Die unterschiedlichen Abbruchraten derjenigen mit Kokainkonsum vor Eintritt gegenüber den nicht Konsumierenden sind statistisch nicht signifikant ($n = 995$). Nach 18 Monaten Behandlung konnte bei den Teilnehmenden ($n = 266$) eine signifikante Reduktion des Kokainkonsums von 84 auf 48 %

festgestellt werden. Die Haltequote im Programm war hoch und auch die mit dem Kokainkonsum zusammenhängenden Faktoren wie Kriminalität, Prostitution und Kontakte zur Drogenszene sind zurückgegangen.

Schlussfolgerungen: Die Annahme, dass die Substitution mit Heroin einen Behandlungskontext erlaubt, der auch zu einer Reduktion des Kokainkonsums führt, kann unterstützt werden.

Résumé

Déclin de l'utilisation de cocaïne intraveineuse chez les toxicomanes traités par prescription d'héroïne

Objectifs: Fournir un traitement d'entretien aux héroïnomanes qui utilisent également de la cocaïne pose des problèmes spécifiques. La polytoxicomanie est fréquente chez les clients du programme suisse pour la prescription médicale d'héroïne (1994–1996).

Méthodes: Les données d'évaluation ont permis de déterminer si l'usage de la cocaïne était associé à un taux d'arrêt de traitement plus élevé et la façon dont l'usage de la cocaïne a changé parmi ceux qui ont poursuivi le traitement. La fréquence de l'usage de cocaïne avant et pendant le traitement a été mesurée par interview tous les six mois et par analyse d'urine tous les deux mois.

Résultats: Il n'y avait pas de différence significative d'arrêt de traitement entre consommateurs et non-consommateurs de cocaïne ($n = 995$). Après 18 mois de prise en charge la consommation de cocaïne a diminué de 84 à 48 % chez les participants ($n = 266$). La rétention des participants dans le programme était élevée et la prévalence de facteurs associés à la consommation de cocaïne tels que la criminalité, la prostitution et les contacts avec les milieux toxicomanes a diminué.

Conclusion: Ces résultats suggèrent que la prescription médicale d'héroïne offre un contexte de prise en charge qui permet également la réduction de la consommation de cocaïne.

References

- Avants SK, Margolin A, Kosten TR. Cocaine abuse in methadone maintenance programs: integrating pharmacotherapy with psychosocial interventions. *J Psychoactive Drugs* 1994; 26: 137–46.
- Ball JC, Ross A. The effectiveness of methadone maintenance treatment. New York: Springer, 1991.
- Bishop YMM, Fienberg SE, Holland PW. Discrete multivariate analysis: theory and practice. Cambridge: MIT Press, 1995.
- Blanken P, Henriks V, Pozzi G, et al. European Addiction Severity Index EuropASI: a guide to training and administering EuropASI interviews. Brussels: COST, 1994.
- Bundesamt für Polizeiwesen. Drogensituation Schweiz, Halbjahresbericht Nr. 1/96. Bern: Bundesamt für Polizeiwesen, 1996.
- Bundesamt für Polizeiwesen. Drogensituation Schweiz, Halbjahresbericht Nr. 1/97. Bern: Bundesamt für Polizeiwesen, 1997.
- Condelli WS, Fairbank JA, Dennis ML, Rachal JV. Cocaine use by clients in methadone programs: significance, scope, and behavioral interventions. *J Subst Abuse Treat*, 1991; 8: 203–12.
- Derogatis LR. SCL-90 R. Administration, scoring and procedures manual I for the R(evised) Version. Baltimore: John Hopkins University, School of Medicine, 1997.
- Des Jarlais DC, Wenston J, Friedman SR, Sotheran JL, Maslansky R, Marmor M. Crack Cocaine use in a cohort of methadone maintenance patients. *J Subst Abuse Treat*, 1992; 9: 319–25.
- Dobler-Mikola A, Pfeifer S, Müller V, Uchtenhagen A. Methadon- und Heroin-unterstützte Behandlung Opiatabhängiger im Vergleich. Zürich: Institut für Suchtforschung, 1998; (Report; no. 62).
- Frei A, Steffen T, Gasser M, et al. Gesundheitsökonomische Bewertung der Versuche für eine ärztliche Verschreibung von Betäubungsmitteln (PROVE). *Soz Präventivmed*, 1998; 43: 185–94.
- Grella CE, Anglin MD, Wugalter SE. Patterns and predictors of cocaine and crack use by clients in standard and enhanced methadone maintenance treatment. *Am J Drug Alcohol Abuse*, 1998; 23: 15–42.
- Hartnoll RL, Mitcheson MC, Batterby A, et al. Evaluation of heroin maintenance in controlled trial. *Arch Gen Psychiatry*, 1980; 37: 877–84.
- Killias M, Rabasa J. Schlussbericht zu den Auswirkungen der Verschreibung von Betäubungsmitteln auf die Delinquenz von Drogenabhängigen. Lausanne: Institut de police scientifique et de criminologie, Université de Lausanne, 1997.
- Kosten TR, Rounsaville BJ, Kleber HD. A 2.5-year follow-up of cocaine use among treated opioid addicts: have our treatments helped? *Arch Gen Psychiatry*, 1987; 44: 281–4.
- Magura S, Kang SY. Validity of self-reported drug use in high risk populations: a meta-analytical review. *Subst Use Misuse*, 1996; 31: 1131–53.
- McLellan AT, Arndt IO, Metzger DS, Woody GE, O'Brien CP. The effects of psychosocial services in substance abuse treatment. *JAMA*; 1993; 269: 1953–9.
- Perneger TV, Giner F, del Rio M, Mino A. Randomised trial of heroin maintenance programme for addicts who fail in conventional drug treatments. *BMJ*, 1998; 317: 13–8.
- Raschke P. Substitutionstherapie: Ergebnisse langfristiger Behandlung von Opiatabhängigen. Freiburg i. Br.: Lambertus, 1994.
- Rawson RA, McCann MJ, Hasson AJ, Ling W. Cocaine abuse among methadone maintenance patients: are there effective treatment strategies? *J Psychoactive Drugs*, 1994; 26: 129–36.
- Rehm J. Konsumformen und Verbreitung illegaler Drogen in der Schweiz. In: Fahrenkrug H, Rehm J, Müller R, Klingemann H, Linder R, eds. *Illegale Drogen in der Schweiz: 1990–1993*. Zürich: Seismo-Verlag: 13–33, 1995.
- Rihs-Middel M. The Swiss Federal Office of Public Health's research strategy and the prescription of narcotics. In: Rihs-Middel M, ed. *The medical prescription of narcotics*. Bern: Hogrefe & Huber: 4–11; 1997.
- Schoenbaum EE, Hartel D, Selwyn PA, et al. Risk factors for human immunodeficiency virus infection in intravenous drug users. *N Engl J Medicine*, 1989; 321: 874–9.
- SPSS. SPSS base system user's guide. Chicago: SPSS, 1994.
- Uchtenhagen A, Dobler-Mikola A, Steffen T, Gutzwiller F, Blättler R, Pfeifer S. Prescription of narcotics for heroin addicts: main results of The Swiss National Cohort Study. Basel: Karger, 1996.
- Uchtenhagen A, Gutzwiller F, Dobler-Mikola A. Medical prescription of narcotics: background and intermediate results of a Swiss national project. *Europ Addict Res*, 1996; 2: 201–7.
- Verthein U, Degkwitz P, Haasen C, Raschke P, Krausz M. Die Substitutionsbehandlung Opiatabhängiger mit Codein/Dihydrocodein und Methadon – ein Kontrollgruppenvergleich. *Sucht*, 1996; 42: 108–17.

Address for correspondence

Richard Blättler
lic. phil. I
Ambulante Drogenhilfe
Bahnhofbrücke 1
8001 Zürich

Tel. ++41 1 213 10 55
Fax ++41 1 213 10 70

e-mail: riblae@riblae.ch