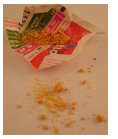
Cocaine Trends: Experiences of the Forensic Toxicology Service



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Introduction

After cannabis, cocaine is the most used illicit drug in Europe with the United Kingdom (UK) being one of the most concentrated areas of usage.[1] This is reflected by the increase in cocaine use amongst 16 to 59 year olds within the UK, which has risen from 0.6% in 1995 to 2.3% in 2008.[2] The rise in popularity of the drug negatively correlates with its monetary value, which has decreased from an average of £87 per gram of powder in 1990 to approximately £42 today.[3,4] This drop may, in part, be linked to the addition of adulterants used to decrease the level of active ingredient per gram, and therefore increase profits.[3]

Local anaesthetics, such as lidocaine, are commonly used as adulterants of cocaine due to their similar chemical structure and properties.[5]
Another commonly used adulterant is the antibiotic medication levamisole, which is used to treat colon cancer and also as anti-worming medication.[6] Its prevalence as an adulterant of cocaine is not understood at present, as it is relatively expensive and it is not anticipated to add to the direct pharmacological effect of the cocaine.[7,8]
Phenacetin is an analgesic compound banned in the UK and other European countries as it can cause kidney failure and cancer. It is known to be an adulterant due to its resemblance to pure cocaine.[9]

Poly-drug use, such as the simultaneous or sequential use of heroin and cocaine is becoming a more noticeable trend. A recent audit of London based drug overdose deaths reported that 73% of positive cocaine cases were also positive for heroin.[10]
Both cocaine use and withdrawal are known to create adverse psychological effects, as the initial high is followed by reduced euphoria and anxiety.[11]
These withdrawal effects can be alleviated by benzodiazepines.[4]

We present here data from cocaine positive cases analysed by the Forensic Toxicology Service over the period January 2007 to November 2008, in order to establish possible trends in cocaine usage. These cases are predominantly concerned with postmortem samples.

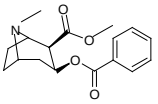

Figure 1: Chemical Structure of Cocaine

Results

Of the cases studied from 2007 (n=82), 20% involved the addition of adulterants. This figure rose to 49% in 2008 (n=79). (Fig 2)
In the instance of local anaesthetics, both lidocaine and benzocaine were detected in the years 2007 and 2008, with Procaine detected in the latter year. In both years, the most frequently detected adulterant was lidocaine which was present in 50% and 47% of cases respectively.
Levamisole was also consistently used and its proportion of the total adulterants remained relatively equal.
Additionally, phenacetin was present over both years, comprising 6% of adulterants in 2007 and decreasing to 3% in 2008.

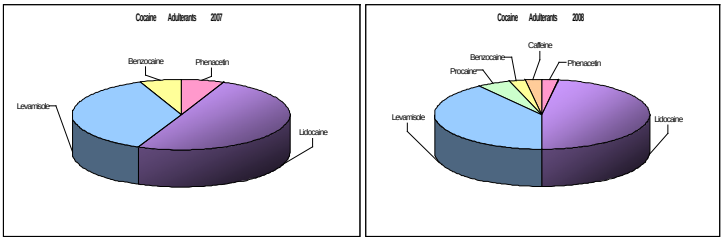

Figure 2: Percentage of Cocaine Adulterants Detected in Samples

Poly-drug use was evident in 77% of cocaine cases in 2007 and 81% in 2008. (Fig 3)
Opiates were the most abundant and were present in 54% of cases in 2007, which was similar to 52% of cases in 2008. Of the opiate positives, at least 34% from 2007 and 46% from 2008 were the result of heroin use. For the purpose of this study heroin covers confirmed 6MAM cases only.
The second most frequently encountered illicit drug was cannabis, which was present in 30% of cocaine cases in 2007 and 26% in 2008.
Along with the apparent trend in illicit drug use, significant benzodiazepine usage in combination with cocaine was noted. Benzodiazepines were detected in 38% of cases analysed in both years.

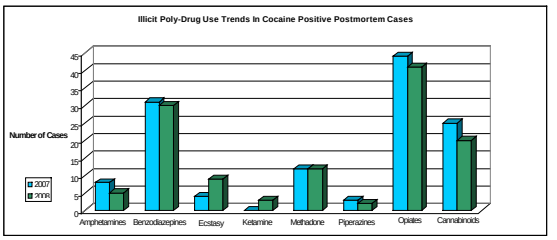

Figure 3: Poly-drug use Trends from 2007 and 2008

Discussion

The use of adulterants evident in our cases has increased dramatically from 2007 to 2008. Within this trend, local anaesthetics and levamisole make up the majority of substances being added.
As discussed previously, lidocaine is probably used to create the impression of high purity due to its similar organoleptic properties to cocaine whilst phenacetin is used due to its similarity in appearance.[5]
The use of levamisole as an adulterant is not fully understood. Its limited availability and high cost of this antibiotic lead us to believe the contamination is at the source of production prior to illegal smuggling into the UK. [8]

Data from our study suggests that illicit poly-drug use has increased, which may have an impact on future toxicological analysis. Heroin had the highest occurrence of the illicit drugs, perhaps due to the pursuit of 'speedballing'.[11]
A significant percentage of benzodiazepine usage in combination with cocaine was noted. There is growing evidence that cocaine users are relying on benzodiazepines to ease withdrawal symptoms, and increasing availability could be facilitating this trend. Nearly two million tablets have been seized by customs in the UK over the past two years, compared to approximately 300,000 in the previous three years.[4]
The combined use of cocaine with other stimulant drugs does not appear to be as prevalent as that of sedative and analgesic drugs.
Our findings are comparable to that of another London audit.[10] (Table 1)

	Amphetamines	Benzodiazepines	Heroin	Methadone
2007 Data	9	38	18	10
2008 Data	6	38	24	15
London Audit	10	32	73	32

Table 1: Comparison of Percentage of Drugs Present in Cocaine Cases

Although heroin was the most commonly encountered illicit drug in both studies, the actual percentage was lower in our study. As previously mentioned the heroin positive cases in our study are confirmed for 6MAM, whereas the London audit groups heroin and morphine positive results together. Opiate positive cases made up 54% of our cases in 2007 and 53% in 2008.
The audit also noted that 32% of cases involved other drugs, mainly antidepressants.[10] This can be related to our data, in which antidepressants featured in 21% of cases in 2007 and 27% in 2008.

Conclusion

The increasing inclusion of drugs, not legally available to the general public, as adulterants, signifies the extent to which they are readily obtained by those not licensed to possess them. This may impact on users as the added compounds may increase the toxicity of their cocaine dose.

We cannot exclude the possibility that other drugs, particularly anaesthetics, may be the result of hospital treatment or therapeutic self administration, consequently the percentages shown may not be as high as first perceived.

The practice of poly-drug use continues to be a common preference amongst cocaine users with sedatives and analgesics being the most widespread. The simultaneous use of cocaine and other stimulant drugs appears to be on the decline. The cocaine trends found in our data demonstrate the importance of continued monitoring and have implications for future toxicological and sample analysis.

References

[1] References down h[1] EMCDDA 2008 Annual Report http://www.emcdda.europa.eu/publications/annual-report/2008 [Accessed 14 Nov 08] **[2]** British Crime Survey 2008 http://www.homeoffice.gov.uk/rds/pdfs08/hosb0708.pdf [Accessed 03 Dec 08] **[3]** Schifano, F. and Corkery,J. *J Psychopharmacol* 22: 71-79 (2008) **[4]** DrugScope Street Trends 2008 http://www.drugscope.org.uk/ourwork/pressoffice/pressreleases/Street-drug-trends-08.htm [Accessed 20 Nov 08] **[5]** Arufe-Martinez, M.I., *et al. J Analytical Tox* 13: 270-274 (1989) **[6]** Fucci, N. *For Sci Int* 172: e1 (2007) **[7]** Valentino, A.M. and Fuentecilla, K. *Micro J* 3: 134-136 (2005) **[8]** Morley, S.R. *et al* www.tiaft2006.org/proceedings/pdf/PT-p-06.pdf [Accessed 28 Nov 08] **[9]** Fucci, N. *For Sci Int* 141: 59-61 (2004) **[10]** Hickman, M *et al. Addiction* 102: 317-323 (2006) **[11]** Jickells, S. and Negrusz, A. ed. Clarke's Analytical Forensic Toxicology London: Pharmaceutical Press, 2008 **[12]** Franceso, L. *et al. Addcition* 98: 7-22 (2003)