Behavioural and Cognitive Psychotherapy (2019), **47**, 622–627
doi:10.1017/S1352465819000213

BABCP
www.babcp.com

BRIEF CLINICAL REPORT

Exposure and response prevention therapy augmented with naltrexone in kleptomania: a controlled case study using galvanic skin response for monitoring

Sebastian Olbrich[1,*], Ina Jahn[2,3] and Katarina Stengler[2,3]

[1]Department for Psychiatry, Psychotherapy and Psychosomatics, University Zurich, Switzerland, [2]Department for Psychiatry and Psychotherapy, University Leipzig, Germany and [3]Department for Psychiatry, Psychotherapy and Psychosomatics, Helios Park Hospital Leipzig, Germany
*Corresponding author. Email: Sebastian.olbrich@puk.zh.ch

(Received 02 April 2018; revised 27 November 2018; accepted 11 December 2018; first published online 21 March 2019)

Abstract

Background: Kleptomania is a disease that shares features with obsessive compulsive spectrum disorders (OCD) and with substance abuse disorders (SAD). This is underlined by therapeutic approaches in kleptomania ranging from cognitive behavioural therapy and selective serotonin reuptake inhibitors that are effective in OCD, and opioid antagonists that are currently being used in SAD. However, almost no literature exists about exposure and response prevention (ERP) therapy in kleptomania. Furthermore, there is a clear lack of objective markers that would allow a therapeutic monitoring.
Aim: To show the effectiveness of ERP therapy in kleptomania in a single case report.
Method: An ERP therapy under real-world conditions and later augmentation with the opioid antagonist naltrexone is described. Continuous measurements of galvanic skin response (GSR) before, during and after therapy sessions are reported in association with changes of the Kleptomania Symptom Assessment Scale (KSAS) self-questionnaire.
Results: While KSAS scores showed a clear treatment response to ERP sessions, the GSR was significantly lower during ERP treatment in comparison with baseline measures. However, during augmentation with naltrexone, GSR measures increased again and clinical severity did not further improve.
Conclusions: This case shows the possible usefulness of ERP-like approaches and therapy monitoring using electrophysiological markers of arousal for individualized treatment in kleptomania.

Keywords: CBT; galvanic skin response; exposure and response prevention; kleptomania

Introduction

Although in DSM-V kleptomania can be found within impulse control disorders, there is some evidence of subgroups of the disorder that share symptom features or are associated with obsessive compulsive spectrum disorders (OCD) (Grant and Chamberlain, 2018; Hollander *et al.*, 1996) or substance abuse disorders (SAD) (Grant, 2006). Similarities between kleptomania and OCD or SAD also exist concerning treatment options that have been proven effective at least at case-report level: selective serotonin reuptake inhibitors (SSRIs) are regarded effective in OCD as well as in kleptomania (Lepkifker *et al.*, 1999). Opioid antagonists such as naltrexone have been used in SAD and kleptomania (Grant *et al.*, 2009, Grant *et al.*, 2014; Mouaffak *et al.*, 2017). Other treatment forms of kleptomania include cognitive behavioural therapy (CBT) (Christianini *et al.*, 2015; Rudel *et al.*, 2009) with covert sensitization and systematic desensitization. However, only little knowledge exists about CBT including exposure and response prevention (ERP) therapy in the treatment of kleptomania although it is regarded as the therapy of choice for OCD

(Abramowitz, 2006). Furthermore, there is a clear lack of neurobiological parameters that would allow an objective monitoring of treatment.

Therefore, we tried an ERP-like real-world protocol with visits in a supermarket to treat a patient with kleptomania. To establish a possible neurobiological marker of treatment response we further recorded galvanic skin response as a screening parameter of the arousal system during exposure and response prevention (Giesbrecht *et al.*, 2010). In addition, we aimed at augmenting the therapy with naltrexone medication at a later stage.

Method

Patient

The patient ('Mrs D') presented (self-initiated) at the beginning of 2014 at the Psychiatric Outpatients Clinic of the University Hospital Leipzig, specializing in OCD and related disorders. Mrs D was then 68 years old, and reported with shame of her stealing behaviour. It started in 2008 with rare events of stealing small items from supermarkets, but the symptoms worsened over time and at the time of presentation stealing occurred almost daily. She further admitted not being in need of the small items (mainly sweets and hygienic articles) that she stole by putting them in her jacket or her bag. Although in the beginning, she wrapped the goods into newspaper and threw them away once at home, she had now started to consume the goods.

Mrs D reported an increasing tension before stealing, a relief just afterwards and great feelings of guilt when she returned home. However, back in the supermarket she could not resist the urge to steal again, although she could financially afford to buy the items legally. There were no signs of other psychiatric disorders or symptoms as mania, delusions, anti-social behaviour or dementia that would have explained the stealing behaviour despite a former depressive episode in 2008 with depressed mood, sleep initiating problems and affective lability. Thus Mrs D fulfilled the criteria for kleptomania according to the DSM-V or ICD-10.

Mrs D gave her written informed consent for this case report.

Assessment

After her introduction in the outpatient clinic the patient underwent a routine diagnostic procedure including blood samples, electrocardiogram (ECG), electroencephalogram (EEG) and cranial magnetic resonance imaging (MRI). There was no somatic cause of her symptoms revealed. Treatment was first started with an SSRI (escitalopram up to 30 mg/day) without a change of symptoms over 1 year. We decided on a shared decision-making process to try out an exposure and response prevention (ERP) within a real-world setting, i.e. a supermarket.

The assessment of baseline severity of symptoms and treatment response were established using the Kleptomania Symptom Assessment Scale (KSAS) self-questionnaire, an instrument widely used in kleptomania research (Grant, 2006). The KSAS consists of 12 items assessing relevant symptoms; scores range between 0 and 48. In addition, the Clinical Global Impression Scale (CGI) was used as an overall measure for treatment response.

As indicator of the sympathetic branch of the autonomous nervous system, the galvanic skin response (GSR), was assessed continuously for 1-min blocks of 20 min recordings before ERP therapy, 45 min during ERP therapy and 30 min afterwards, using the SenseWear™ Armband (SWA; BodyMedia, Inc. Pittsburgh, PA, USA). The device was placed on the upper arm of the dominant side. Skin conductance measures have been shown to be sensitive to psychosocial stress situations and therefore were used to monitor the course of treatment.

Design and statistics

We used an ABA single case study design for three different treatment approaches. It is a matter of ongoing debates which statistical approaches should be used in single case studies (Crawford and

https://doi.org/10.1017/S1352465819000213 Published online by Cambridge University Press

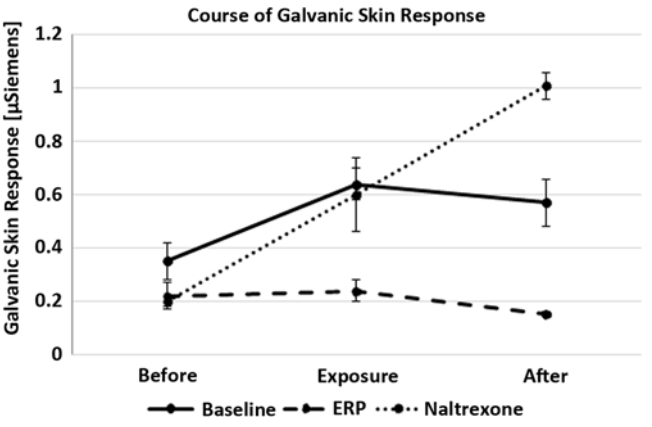

Figure 1. Time courses of the sympathetic arousal as measured by galvanic skin response (GSR) before entering the supermarket ('Before'), during the exposure and response prevention session ('Exposure') and during rest after leaving the supermarket ('After') for the three different conditions without treatment ('Baseline'), with ERP treatment ('ERP') and with ERP treatment augmented with naltrexone ('Naltrexone').

Garthwaite, 2012). Especially for single case designs comparing different treatments within one individual, analysis of variance (ANOVA) approaches have been suggested in the past (Shine and Bower, 1971). Although there are also critics of these computations due to increased risk of type I errors (Toothaker *et al.*, 1983), we decided to use an ANOVA calculation (Gentile *et al.*, 1972) for repeated measures (Armstrong *et al.*, 2002). For the analysis, values of fifteen 1-min blocks (highest number available for all blocks, all subjects and all conditions) from each time (baseline, exposure, post) and each treatment condition (no treatment with two visits, ERP with three visits, ERP + naltrexone with five visits) were entered into the model. A repeated measures ANOVA with a 3 condition (treatments) × 3 time point (pre, exposure, post) design was computed. *Post-hoc* pairwise comparisons were corrected using the *Šidák* approach. Significance level was set to $p < 0.05$, and we used software SPSS 23 (IBM Corp., Armonk, NY, USA; released 2015, Statistics for Windows, version 23.0).

Results

At the beginning of 2015, Mrs D decided to intensify her therapy due to her low quality of life. Her KSAS score was 32 at that point, and CGI index was 6 ('severely ill'). Psychotherapy started with two baseline visits at a large supermarket. Mrs D was followed by the therapist and she was asked to look for three different goods that she would steal if she were on her own and put them into her shopping trolley. Then she was asked to remove these items from her trolley and put them back on the supermarket shelves. These actions were associated with high tensions and a clinically visible increase of sympathetic activity such as increasing breathing frequency and sweating. Afterwards Mrs D was allowed to buy one item (that she had to name before entering the shop) and to pass the cash desk. These actions were again associated with high tensions. Visits to the supermarket were restricted to about 45 minutes. For baseline GSR (see Fig. 1) there was a sharp increase of sympathetic arousal from before the visit to the supermarket compared with the visit at the supermarket.

After the two baseline visits, Mrs D received CBT sessions including short lessons of covert sensitization and psychoeducation. Three more visits (every 2 days) to the supermarket then took place. This time she repeatedly had to take the goods and put them back again until she felt a decrease of tension and anxiety >50% of her initially reported tension level. After these ERP therapy sessions, her KSAS score fell to 22 and CGI showed a severity of 4 ('moderately ill') and a therapeutic effect index of 3 ('moderate') marking the response to the treatment. GSR clearly decreased before, during and after a visit to the supermarket in comparison with baseline conditions (Fig. 1)

In addition, treatment with naltrexone was started at this point (at first 50 mg/day, after 5 days 100 mg/day) for treatment augmentation. Five more visits to the supermarket followed. However,

https://doi.org/10.1017/S1352465819000213 Published online by Cambridge University Press

KSAS score increased slightly from 22 to 23, and CGI did not show any further benefit in comparison with treatment without naltrexone. However, through the whole course of the treatment Mrs D did not steal, which was a great success for her.

The repeated measures ANOVA showed a significant effect of time (baseline–exposure–post) with $F\ (2,146) = 72.89$, $p < 0.01$ and a significant effect of time × group (no treatment–ERP–ERP+naltrexone) with $F\ (4,294) = 20.34$, $p < 0.01$). *Post-hoc* correction for multiple comparisons revealed a significant difference with lower GSR measures for the ERP condition in comparison with the no-treatment condition ($p < 0.01$) and the naltrexone condition ($p < 0.01$). No difference was found for the comparison of baseline with the naltrexone condition (for time series of conditions, see Fig. 1).

Discussion

The course of the treatment shows that ERP sessions in combination with other CBT features are a valid option to treat kleptomania (Rudel *et al.*, 2009). Although it is a time-consuming method, the rapid decline of autonomic nervous system (ANS) activity levels in parallel with decreasing KSAS scoring suggests a strong effect on the behaviour and the nervous system of the patient, following classical cognitive behavioural therapy. Although the raw values of the ANS activity and the used ANOVA approach show clear results, an in-depth analysis has to been done for replication in a much larger sample.

It is also interesting that the additional augmentation with naltrexone did not result in further decline of symptoms. However, as the psychopharmacological intervention with naltrexone was established only after the ERP sessions, the results of this case do not allow any conclusion for naltrexone treatment as a first-line therapy. However, in the light of the ANS results it is remarkable that the GSR levels during naltrexone treatment rose above the baseline level (without therapy) during exposure and especially during rest afterwards, suggesting a totally different mechanism of action of this kind of treatment. Also, some evidence exists (Behnoush *et al.*, 2013) for naltrexone to possibly induce a serotonergic syndrome with increased sympathetic activity. Although the patient in our case did not show any clinical signs of a serotonergic syndrome, this effect of naltrexone might have led to increased GSR levels.

Although a decrease of the KSAS from 32 to 22 points after ERP sessions only marks a partial response, the fact that the patient did not steal during the whole course of treatment remains remarkable (before the therapy, Mrs D stole almost every day), showing that treatment was effective despite the remaining symptoms as assessed via KSAS.

The very nature of kleptomania is the stealing of goods, e.g. from supermarkets. As this is a legal threat, it is not possible to completely duplicate this condition in an ERP setting. For ethical reasons it is advisable to talk to the patient about possible legal consequences and inform the supermarket officials before starting the therapy.

There is a considerable lack of diagnostic and/or predictive markers in psychiatry that are valid and easy to use for the transfer into a clinical setting (Venkatasubramanian and Keshavan, 2016). However, within recent years an increasing amount of evidence has been accumulated that inflammatory (Fraguas *et al.*, 2017), genetic (Breitenstein *et al.*, 2015) or neuroimaging biomarkers (e.g. Xia *et al.*, 2018) have discriminative or predictive power, although the associations between markers and treatment response are sometimes counter-intuitive. However, in the field of functional biomarkers, e.g. in neurophysiological research, several large studies have revealed meaningful patterns of ANS and CNS activity (Arns *et al.*, 2015; Olbrich *et al.*, 2016; Pizzagalli *et al.*, 2018) that may inform the diagnostic process and the choice of treatment. The presented case now adds a possible marker for ERP treatment. It should be the focus of further research into how far GSR activity might help to identify patients that are in favour of a successful special treatment regime.

https://doi.org/10.1017/S1352465819000213 Published online by Cambridge University Press

Conclusion

The results of this single case study underline the effectiveness of exposure and response prevention strategies in kleptomania. Although time intensive, this treatment approach grabs the symptoms where they occur and allows a personalized protocol for each patient. Patients suffering from kleptomania are likely to be able to transfer the new learned behaviours into their daily living routine.

Furthermore, the used GSR assessment seems to be a valid approach to monitor the sympathetic arousal and its decline during ERP sessions. Future approaches could use the direct assessment of arousal for direct neurofeedback to improve therapy outcome.

Author ORCID. Sebastian Olbrich, 0000-0001-5557-4878

Acknowledgement. We would like to thank Christian Sander for his support in using the skin conductance device.

Financial support. This work did not receive any grant support.

Conflicts of interest. The authors have no conflicts of interest.

Ethical statement. The study followed the Ethical Principles of Psychologists and Code of Conduct as set out by the APA. Ethical approval was not necessary as the treatment of the patient was part of a standard application of routine clinical practice in the specialized outpatients clinic of the hospital. Written informed consent for publication of the data was obtained from the patient.

References

Abramowitz, J. S. (2006). The psychological treatment of obsessive-compulsive disorder. *Canadian Journal of Psychiatry. Revue Canadienne De Psychiatrie*, *51*, 407–416.

Armstrong, R. A., Eperjesi, F. and Gilmartin, B. (2002). The application of analysis of variance (ANOVA) to different experimental designs in optometry. *Ophthalmic and Physiological Optics*, *22*, 248–256. doi: 10.1046/j.1475-1313.2002.00020.x

Arns, M., Bruder, G. E., Hegerl, U., Spooner, C., Palmer, D. M., Etkin, A., *et al*. (2015). EEG alpha asymmetry as a gender-specific predictor of outcome to acute treatment with different antidepressant medications in the randomized iSPOT-D study. *Clinical Neurophysiology*, *127*, 509–519.

Behnoush, B., Memarian, A. and Teimoory, M. (2013). Naltrexone induced serotonin syndrome. *International Journal of Medical Toxicology and Forensic Medicine*, *3*, 64–66. doi: 10.22037/ijmtfm.v3i2(Spring).3991

Breitenstein, B., Brückl, T. M., Ising, M., Müller-Myhsok, B., Holsboer, F. and Czamara, D. (2015). ABCB1 gene variants and antidepressant treatment outcome: A meta-analysis. *American Journal of Medical Genetics. Part B, Neuropsychiatric Genetics: The Official Publication of the International Society of Psychiatric Genetics*, *168B*, 274–283. doi: 10.1002/ajmg.b.32309

Christianini, A. R., Conti, M. A., Hearst, N., Cordás, T. A., de Abreu, C. N. and Tavares, H. (2015). Treating kleptomania: cross-cultural adaptation of the Kleptomania Symptom Assessment Scale and assessment of an outpatient program. *Comprehensive Psychiatry*, *56*, 289–294. doi: 10.1016/j.comppsych.2014.09.013

Crawford, J. R. and Garthwaite, P. H. (2012). Single-case research in neuropsychology: a comparison of five forms of t-test for comparing a case to controls. *Cortex; a Journal Devoted to the Study of the Nervous System and Behavior*, *48*, 1009–1016. doi: 10.1016/j.cortex.2011.06.021

Fraguas, D., Díaz-Caneja, C. M., Rodríguez-Quiroga, A. and Arango, C. (2017). Oxidative stress and inflammation in early onset first episode psychosis: a systematic review and meta-analysis. *International Journal of Neuropsychopharmacology*, *20*, 435–444. doi: 10.1093/ijnp/pyx015

Gentile, J. R., Roden, A. H. and Klein, R. D. (1972). An analysis-of-variance model for the intrasubject replication design. *Journal of Applied Behavior Analysis*, *5*, 193. doi: 10.1901/jaba.1972.5-193

Giesbrecht, T., Merckelbach, H., van Oorsouw, K. and Simeon, D. (2010). Skin conductance and memory fragmentation after exposure to an emotional film clip in depersonalization disorder. *Psychiatry Research*, *177*, 342–349. doi: 10.1016/j.psychres.2010.03.010

Grant, J. E. (2006). Kleptomania. In E. Hollander and D. J. Stein (eds), *Clinical Manual of Impulse-Control Disorders* (pp. 175–201). Arlington, VA, USA: American Psychiatric Publishing, Inc.

Grant, J. E. and Chamberlain, S. R. (2018). Symptom severity and its clinical correlates in kleptomania. *Annals of Clinical Psychiatry: Official Journal of the American Academy of Clinical Psychiatrists*, *30*, 97–101.

Grant, Jon E., Kim, S. W. and Odlaug, B. L. (2009). A double-blind, placebo-controlled study of the opiate antagonist, naltrexone, in the treatment of kleptomania. *Biological Psychiatry*, *65*, 600–606. doi: 10.1016/j.biopsych.2008.11.022

Grant, J. E., Odlaug, B. L., Schreiber, L. R. N. and Kim, S. W. (2014). The opiate antagonist, naltrexone, in the treatment of trichotillomania: results of a double-blind, placebo-controlled study. *Journal of Clinical Psychopharmacology*, *34*, 134–138. doi: 10.1097/JCP.0000000000000037

Hollander, E., Kwon, J. H., Stein, D. J., Broatch, J., Rowland, C. T. and Himelein, C. A. (1996). Obsessive-compulsive and spectrum disorders: overview and quality of life issues. *Journal of Clinical Psychiatry*, *57* (suppl 8), 3–6.

Lepkifker, E., Dannon, P. N., Ziv, R., Iancu, I., Horesh, N. and Kotler, M. (1999). The treatment of kleptomania with serotonin reuptake inhibitors. *Clinical Neuropharmacology*, *22*, 40–43.

Mouaffak, F., Leite, C., Hamzaoui, S., Benyamina, A., Laqueille, X. and Kebir, O. (2017). Naltrexone in the treatment of broadly defined behavioral addictions: a review and meta-analysis of randomized controlled trials. *European Addiction Research*, *23*, 204–210. doi: 10.1159/000480539

Olbrich, S., Tränkner, A., Surova, G., Gevirtz, R., Gordon, E., Hegerl, U. and Arns, M. (2016). CNS- and ANS-arousal predict response to antidepressant medication: findings from the randomized iSPOT-D study. *Journal of Psychiatric Research*, *73*, 108–115. doi: 10.1016/j.jpsychires.2015.12.001

Pizzagalli, D. A., Webb, C. A., Dillon, D. G., Tenke, C. E., Kayser, J., Goer, F., *et al.* (2018). Pretreatment rostral anterior cingulate cortex theta activity in relation to symptom improvement in depression: a randomized clinical trial. *JAMA Psychiatry*, *75*, 547–554. doi: 10.1001/jamapsychiatry.2018.0252

Rudel, A., Hubert, C., Juckel, G. and Edel, M.-A. (2009). [Combination of dialectic and behavioral therapy (DBT) and duloxetin in kleptomania]. *Psychiatrische Praxis*, *36*, 293–296. doi: 10.1055/s-2008-1067564

Shine, L. C. and Bower, S. M. (1971). A one-way analysis of variance for single-subject designs. *Educational and Psychological Measurement*, *31*, 105–113. doi: 10.1177/001316447103100108

Toothaker, L. E., Banz, M., Noble, C., Camp, J. and Davis, D. (1983). $N = 1$ designs: the failure of ANOVA-based tests. *Journal of Educational Statistics*, *8*, 289–309. doi: 10.3102/10769986008004289

Venkatasubramanian, G. and Keshavan, M. S. (2016). Biomarkers in psychiatry – a critique. *Annals of Neurosciences*, *23*, 3–5. doi: 10.1159/000443549

Xia, C. H., Ma, Z., Ciric, R., Gu, S., Betzel, R. F., Kaczkurkin, A. N., *et al.* (2018). Linked dimensions of psychopathology and connectivity in functional brain networks. *Nature Communications*, *9*, 3003. doi: 10.1038/s41467-018-05317-y

Cite this article: Olbrich S, Jahn I, and Stengler K (2019). Exposure and response prevention therapy augmented with naltrexone in kleptomania: a controlled case study using galvanic skin response for monitoring. *Behavioural and Cognitive Psychotherapy* **47**, 622–627. https://doi.org/10.1017/S1352465819000213