Aim. A variety of sources indicate that oxytocin has beneficial effects on several components of sexuality. This is a case report on a male who had significant, broad-spectrum improvements in sexual function during a course of intranasal oxytocin treatment for social anxiety.

Methods. The patient was in individual treatment for a variety of difficulties, including social avoidance and relational problems. A biopsychosocial evaluation ruled out medical conditions and substance-related issues as a cause of sexual difficulties. After obtaining informed consent, an off-label trial of intranasal oxytocin was administered targeting his social anxiety and relational avoidance.

Results. Oxytocin positively impacted a number of components of sexual function, including libido, erection, and orgasm, and was well tolerated.

Conclusions. This is the first case we are aware of documenting broad-spectrum benefits of chronic intranasal oxytocin on male sexual function. Future trials of oxytocin for psychiatric indications should specifically monitor its effects on sexuality, and trials directly investigating oxytocin’s impact on aspects of sexual function are warranted.


Key Words. Intranasal; Brain/Physiology; Adult; Male; Humans; Libido/Drug Effects; Sexual Behavior/Physiology; Oxytocin/Administration and Dosage

Introduction

Reports on the clinical use of oxytocin (OT) for psychiatric indications are multiplying rapidly. These include placebo-controlled trials identifying its benefits in anxiety, schizophrenia, and borderline personality disorder ([1] for review). In the context of this trend, it is notable that one persistent and pernicious class of side effects of many front-line pharmacological treatments for these conditions—a class of effects of particular relevance to OT—are abridgements of sexual function. We here report on a male outpatient who reported broad-spectrum, clinically salient beneficial effects of OT on his sexual function in the context of a trial of intranasal (IN) OT for social anxiety.

Case

Mr. B is a 32-year-old married father of three who presented for treatment of adult attention deficit/hyperactivity disorder (ADHD). Though successful in business, he reported a history of chronic social estrangement, difficulty attending to social cues, and an innate aversion to social relationships. In work situations, for example, he noted that he avoided engaging with employees, though he “knows he should mix more.” Both he and his wife endorsed that he displays a lack of spontaneous social sharing and a constricted range of interests. These impairments affected both his work as well as his relationship with his wife and children. As part of his intake assessment, the patient
completed the Temperament and Character Inventory, which was notable for low reward dependence, a temperamental trait consistent with social detachment. His score on the Autism quotient scale was 26, the suggested threshold for Asperger’s syndrome [2]. His clinical interview was notable for anxiety around emotional topics and reflexive avoidance of and discomfort with direct eye contact. Diagnostically, Mr. B met Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) criteria for ADHD and social phobia, and though he did not meet strict DSM-IV criteria, he was considered in the Asperger’s “spectrum.”

Though Mr. B’s ADHD responded well to treatment with lisdexamfetamine, sertraline was only mildly helpful in decreasing his social anxiety symptoms. These lackluster effects, as well as sexual side effects (decreased libido, unaided by a trial of tadalafil), led to the eventual discontinuation of sertraline. Occasional binge drinking dissuaded a trial of a benzodiazepine. The patient had no medical comorbidities which could interfere with sexual function.

Guided by extant literature suggesting that OT may have clinically salient prosocial effects in patients with Asperger disorder [3], and that beneficial social effects of OT may occur most prominently in socially and emotionally impaired male subjects [4], a trial of intranasal OT was discussed with the patient. After a discussion of the potential risk and benefits of off-label use of OT, informed consent was obtained, and the patient was prescribed 20 IU intranasal OT twice daily (BID), targeting his social anxiety and avoidance. This dose was chosen as it is in the range of the extant literature on safe and tolerable chronic OT dosing [5–7], though in point of fact, the optimal intranasal dosing of OT for any clinical condition (save augmentation of lactation) has not been adequately explored.

Treatment with OT, though not particularly helpful with his social phobia symptoms, did result in several interesting improvements in his behavior in his marital relationship. These changes were noted spontaneously by the patient and corroborated by his wife. Regarding work relationships, the patient noted a subtle but observable change in his subjective anxiety around colleagues, and noted that he spontaneously (appropriately) hugged a female work colleague in a very “out of character” way. In his marriage, the patient reported that while using OT, he was more spontaneously affectionate with his wife, which led to increased sexual intimacy. Importantly, these effects were present when using the spray, disappeared on discontinuation, and reappeared each of the several times he restarted the medication (these breaks in treatment were occasioned by his delays in refilling the prescription). Reports from his wife corroborated that while using the spray he “wants to be closer,” that he was more “touchy” in terms of spontaneous nonsexual affection, and that though this effect was subtle, it was a recognizable change from his prior behavior.

The most notable benefits of OT, however, were on his sexual function. On the Arizona Sexual Experience Scale, his total score improved by 46% (from 19 to 13), and improvements were seen in all the items of the scale: libido (from 5 [very weak] to 3 [somewhat strong]), sexual arousal (from 4 [somewhat difficult] to 3 [somewhat easy]), erectile function (from 4 [somewhat difficult] to 2 [very easily]) and satisfaction with orgasm (from 3 [somewhat satisfying] to 2 [very satisfying]). At time of writing this report, the patient has been taking OT spray daily for several months, and reports continued stable benefit with no discernable adverse effects based on routine clinical monitoring.

Discussion

Three points of this case warrant mention. First, though a vast literature documents OT’s role in a variety of aspects of sexual function (i.e., sexual interest, erectile function, orgasm) in animals, and though reports of broad-spectrum sexual benefits of oral OT in males dates back to 1977 [8], ours is the first report we are aware of documenting broad-spectrum sexual benefits of intranasal OT in a male. Given that intranasal OT is currently the preferred delivery system for this drug, and given OT’s potential for clinical usage in disease states where extant pharmacological treatments (i.e., antidepressants, antipsychotics) have largely negative effects on sexuality, these findings are particularly notable. We also highlight other convergent evidence supporting OT’s role in sexual function in humans, including studies documenting an increase in OT during both male and female orgasm [9], the suggestion of altered perception of arousal in men who used OT before self-stimulation and orgasm [10], increased sexual desire and orgasm in a female using intranasal OT for breastfeeding [11], and reversal of anorgasmia with IN OT given intracoitally [12]. In terms of Mr. B’s response, improvements were noted across a range of sexual parameters, with an overall magnitude of improvement in keeping with that of other U.S. Food and Drug Administration approved erectile dysfunction (ED) treatments (i.e., sildenafil) [13].
These broad-spectrum improvements in several phases of the sexual cycle—anticipatory desire as well as consummation and reward—are consistent with OT’s interaction with the mesolimbic dopaminergic system, which is involved in both motivational as well as rewarding aspects of sexual behavior [14]. Specifically, neuroanatomically precise animal experiments indicate that injections of OT into the ventral subiculum of the hippocampus stimulate erection via an increase in glutamic acid neurotransmission in the ventral tegmental area [15]. This increase in turn augments dopaminergic activity in mesolimbic and mesocortical pathways, in the medial prefrontal cortex, and in the nucleus accumbens. The latter then triggers incerto-hypothalamic neurons in the paraventricular nucleus, which has multiple direct oxytocinergic projections to the brainstem and spinal cord (mediating erection) as well as to other cortical and subcortical regions [14–16]. These widespread effects in multiple brain areas inform OT’s putative effects on penile erection and copulation as well as sexual motivation, reward, and arousal. Dopaminergic circuits may not be the only signaling pathways affected: other experiments indicate that targeted injection of OT into the ventral tegmental area induces erection through nitric oxide and guanylate cyclase pathways [17]. Moreover, regarding putative mechanisms of action, it is possible that OT’s peripheral effects in the smooth muscle of the penis [18] play a role in some of the observed benefits. We duly note the limitations of single, uncontrolled case reports, and the difficulty distinguishing a true drug response from a placebo response, though the sustained nature of the response, the fact that it occurred in the context of a trial for anxiety, and the on-off-on treatment response diminishes this likelihood.

Second, and more speculatively, we suggest that part of the observed effects of OT may relate to its ability to subliminally prime attachment-related neural networks [19], networks which are conglutinated with those related to human sexuality [20]. Translational OT research has been vital in outlining this neuroanatomical overlap between attachment, sexuality, and sociability [14]. The fact that many of OT’s effects in humans appear to be context dependent and socially specific, and that acute and chronic treatment may differ may explain why pro-sexual effects have not been noted in the large number of single-dose experiments with OT to date [1].

Third and lastly, from a wider clinical perspective, this report and others documenting OT’s beneficial effects on components of human sexuality [8,11,12] auger the possibility that OT may not only lack the problematic sexual side effects of other psychopharmacological treatments, but may even play a primary role in amelioration of a broad range of sexual difficulties. Given the current paucity of literature on intranasal OT’s impact on human sexual function, we recommend that future clinical studies of OT for other indications proactively investigate these effects, including examination of context-dependence, dose-responsiveness and durability of effects. More specifically, these findings support trials directly examining the use of OT to treat problems in this vital aspect of human function, especially in the context of stable, loving relationships.

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