Burping and Botox: the relieving effect of botulinum toxin on R-CPD patients

A patient presented to Dr. Robert W. Bastian in 2015. He had seen various doctors already but no one was able to solve his problem. Chest pain after eating or drinking, bloating, nausea, loud gurgling noises in his throat: the man was incapable of burping. By injecting botulinum toxin (BT) into the cricopharyngeus muscle (CPM), Bastian was the first person to find a solution for this problem. The BT caused the tense muscle to relax, allowing the gas to exit through the esophagus. After the cured patient shared his story on the internet, lots of people presented to Bastian to find relief. In their paper, Bastian and Smithson (2019) for the first time identified this syndrome as R-CPD: retrograde cricopharyngeal dysfunction. They reported the results of 51 of their patients 6 months after they had undergone the same treatment. This treatment was performed in an operating room under general anesthesia. Esophagoscopy was used to look at the CPM. All patients gained the ability to burp after the treatment. They had to learn to control the initiation and timing of the burping. During the post-treatment period of 6 months, 11 out of 51 patients lost their ability to burp again. Some of them had received a second injection later, which relieved them of the symptoms again.

In a 2021 study by Wajsberg et al., the authors studied the efficacy of an in-office treatment for R-CPD. BT was injected into the CPM of 18 patients, guided by electromyography to locate this muscle. The study of an in-office treatment was motivated by the fact that Dr. Bastian's treatment appeared to have unpleasant side-effects: not related to the BT, but to the general anesthesia and the esophagoscopy. On the contrary, the in-office treatment consists of a percutaneous injection of BT, using only topical anesthesia to numb the skin. Additionally, the in-office treatment costs less. After this treatment, all 18 patients gained the ability to burp. 6 of these patients had undergone a BT treatment before, using the esophagoscopy method. Out of these patients, only 1 patient remained able to burp after 6 months. In conclusion, most of these patients lost the ability twice, even though two different treatments were tried. According to Wajsberg et al. (2021), this implied that these patients would have difficulties maintaining the capability of burping when the BT wears off. For the remaining 12 patients it was their initial treatment. Out of these patients, only 20% lost their ability to burp within 6 months. This result was consistent with the results of Bastian's treatment (Bastian & Smithson, 2019).

The in-office option is not the only alternative treatment without general anesthesia. Xie et al. (2022) successfully relieved an R-CPD patient of their symptoms by injecting BT without the need for esophagoscopy or anesthesia. They located the CPM using ultrasound, a catheter ball and electromyography. Next, they performed a percutaneous BT injection.

A case report by Yakubu Karagama (2021) pointed out the effect of an increased dose of BT. Whereas Wajsberg et al. (2021) and Bastian and Smithson (2019) injected 50 or 75 units of BT into the CPM, Karagama injected 50, 75 or 100 units of BT. Karagama reported that all 72 R-CPD patients he treated gained the ability to burp. Moreover, 96% of the patients maintained the ability to burp even after the BT wore off, which is usually after 3-4 months, according to Karagama (2021). These 69 people were still able to burp during the entire follow-up, which had an average of 24 months. Everyone who received 100 units of BT, remained capable of burping. Of the 4% of the patients who lost their ability to burp, everyone received 50 or 75 units of BT. From these results, Karagama (2021) concluded the effect of a higher dose of BT on the success rate of the treatment.

On the other hand, a case report by Pavesi et al. (2023) reported the successful treatment of an R-CPD patient using a dose of only 10 BT units. They performed a percutaneous injection using electromyographic guidance, similar to the method described by Wajsberg et al. (2021). Therefore, Pavesi et al. (2023) showed the positive clinical outcome using a very low dose of BT.

Non-BT treatments

The BT injection was the first treatment that actually solved the problem for R-CPD patients. However, alternative treatments were designed. A case report by Bastian and Hoesli (2020) described a patient that had already undergone a BT treatment twice and still kept losing the ability to burp. The patient decided to undergo endoscopic myotomy. Using a CO_2 laser, a part of his CPM was cut, leaving only 20% of the muscle intact. At the follow-up after 6 months, he was still relieved of the symptoms.

Recently, researchers gained a new insight. Since most of the patients who underwent a BT treatment remained able to burp even when the BT had worn off, it seemed that while the BT effect lasted, the brain re-established its mechanisms for burping (Anbar & Spence, 2023). This led Anbar and Spence to believe that R-CPD might be a functional disorder. They stated that the cause of the disorder might not be physical, because otherwise the symptoms would return once the BT effect wears off. Instead, the cause lies in the brain. According to Anbar and Spence (2023), a BT injection should not be the first approach to treat R-CPD. Instead, non-invasive treatments should be used as it is a functional disorder. In their case report published on September 13 2023, the authors described how a patient taught himself to burp. The patient was considering to undergo a BT treatment. However, the researchers insisted that he first tried an approach that had helped him before: the patient had overcome anxiety and insomnia using hypnosis. He followed their advice and this approach appeared to be successful. The patient imagined his throat covered in a numbing cream to numb the gag reflex he was afraid of, and then he let his subconscious relax the muscles in his throat. This allowed him to let out small burps. Within 6 months he was able to let out bigger burps.

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