

Transoral thyroid and parathyroid surgery: still experimental!

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It was with great interest that we read the report by Karakas et al. [1] on transoral thyroid and parathyroid surgery. By using a modified rigid rectoscope (oraloscope) hemithyroidectomies as well as resection of parathyroid glands could be performed in ten porcine cadavers, then in 10 living and orally intubated pigs, and finally in five human corpses. Because unfortunately many claims and statements in their report are misleading, we believe that rectifications are needed.

Karakas et al. stated in the “Introduction” of their article that “For the first time, we describe an entirely transoral access, which allows for a hemithyroidectomy and parathyroidectomy without an accessorial incision of the skin in pigs and human cadavers.” Later, in the “Results” section, they affirm that “This is the first study to demonstrate that transoral resection of thyroid and parathyroid glands is feasible using an entirely transoral access to the thyroid region.” Both statements are wrong. Transoral thyroid surgery is an innovative project that was initiated in

September 2007 by the New European Surgical Academy (NESA) and developed in cooperation with the Department of Neuroscience Anatomy at the Erasmus MC University in Rotterdam, The Netherlands. It is a part of the NESA’s Natural Orifice Surgery (NOS) project that includes investigation of transvaginal and transoral access for various surgical procedures [2–4]. Transoral thyroidectomy is based on the hybrid technique invented by our member Kai Witzel, who was the first to describe transoral access to the thyroid [5]. Our main goal was the investigation and introduction of a technique of totally endoscopic thyroid resection that is minimally invasive and safe for the patient and also cosmetically optimal (scarless). The first step of this project consisted of anatomic studies with instrument development performed on three human cadavers. Following these detailed studies, safety and reproducibility to reach and resect the thyroid gland were assessed according to a defined road map in two cadavers. On 14 May 2008 we succeeded in performing a totally transoral video-assisted thyroidectomy that we named TOVAT. On 31 August 2008 this method was successfully used in five living pigs. On 13 September 2008 we submitted a video paper to *Surgical Endoscopy* that was accepted on 8 January 2009 and published online on 5 March 2009 [6]. Karakas et al. submitted their manuscript to *Surgical Endoscopy* on 12 June 2009, 3 months after the online publication of our video paper in the same journal, long after our paper was available on PubMed and other search engines. Moreover, we presented TOVAT as early as 30 August 2008 at the 20th International Conference of the Society for Medical Innovation and Technology (SMIT) in Vienna [7]. The abstract of this oral presentation was also published at that time in *Minimally Invasive Therapy and Allied Technologies* [8]. All this makes it legitimate to raise serious concerns over Karakas’ literature search before starting their

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experiments and at the latest before submitting their manuscript to *Surgical Endoscopy*.

As for the paper itself: In the “Methods” section the authors stated that “Based on the similarity of the topographical anatomical conditions in pigs and humans, especially regarding the thyroid region and the recurrent laryngeal nerve, all animal experiments were performed in juvenile pigs.” In order to substantiate this statement the authors cited a paper of Schiel et al. [9]. This publication, however, does not describe any similarity of the topographical anatomical conditions in pigs and humans regarding the thyroid region, but solely (!) investigated the course of the recurrent laryngeal nerve. It has been well known for more than 80 years that there are fundamental surgical distinctions between pigs and humans regarding the topographical anatomy of the thyroid. The neck in pigs is much wider than in humans, thus enabling better manipulation of instruments. Moreover, thyroidectomy in pigs is much easier to perform because of the peculiar anatomic relationships of the gland, the absence of definite parathyroid glands, and its simple blood supply [10]. This is the reason why “...the transoral procedure was surprisingly easy to perform,” as stated by Karakas et al. later in the “Results” section.

In the “Methods” section the authors stated that “Additional insufflation of carbon dioxide (CO₂) gas to establish a pneumocollum was unnecessary.” This statement is puzzling since it is difficult to imagine how it is possible to manipulate organs and instruments in such a small working space without any supporting measures. To date, almost all reported totally endoscopic thyroidectomies have been performed by using low-pressure carbon dioxide (6 mmHg) insufflation to establish a pneumocollum [11]. A few authors reported gasless lifting methods as an alternative, but they necessitate specially made retractors and hooks that are passed through the chest wall to the lateral neck bilaterally [12–14]. Do Karakas et al. have any clinical experience with totally endoscopic thyroid resections? If yes, do they perform these operations and other extra-abdominal procedures such as retroperitoneoscopy or totally extraperitoneal endoscopic hernioplasty (TEP) gasless?

In the “Discussion” section the authors stated “... to date parathyroidectomy rather than thyroidectomy seems to be feasible via our new approach, due to the narrow access via the rigid oroscope (maximum 25 mm in diameter).” Why maximum 25 mm? Where is the evidence of such a claim?

Although the surgical feasibility of TOVAT was demonstrated on 14 May 2008, we still had concerns about the safety of its clinical application. Some of these were also raised by Paolo Miccoli and his colleagues in a letter to the editor in response to our video paper [15, 16]. One of the

crucial points of TOVAT is the access itself because the floor of mouth is limited in size and might be damaged by an oversized instrument or large specimen. To our knowledge there are no data concerning the maximum diameter of an instrument that might be introduced and the specimen volume that can be removed without causing scar formation which would result in swallowing disorders. In this sense, this and other unsubstantiated statements should be carefully assessed.

To conclude, we are convinced that transoral thyroid and parathyroid surgery is indeed a promising approach but still experimental. In order to achieve safe and optimal results, further refinements to access and of the instruments as well as preclinical studies are needed.

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References

- Karakas E, Steinfeldt T, Gockel A, Westermann R, Kiefer A, Bartsch DK (2010) Transoral thyroid and parathyroid surgery. *Surg Endosc* 24(6):1261–1267
- Benhidjeb T, Witzel K, Bärlechner E, Stark M (2007) The natural orifice surgery concept. Vision and rationale for a paradigm shift. *Chirurg* 78:537–542 (in German)
- Stark M, Benhidjeb T (2008) Natural orifice surgery: transdouglass surgery—a new concept. *J Soc Laparoendosc Surg* 12:295–298
- Benhidjeb T, Burghardt J, Stark M (2008) Novel technologies for natural orifice surgery: an overview. *Minim Invasive Ther Allied Technol* 17:346–354
- Witzel K, von Rahden BHA, Kaminski C, Stein HJ (2008) Transoral access for endoscopic thyroid resection. *Surg Endosc* 22:1871–1875
- Benhidjeb T, Wilhelm T, Harlaar J, Kleinrensink GJ, Schneider TA, Stark M (2009) Natural orifice surgery on thyroid gland: totally transoral video-assisted thyroidectomy (TOVAT): report of first experimental results of a new surgical method. *Surg Endosc* 23:1119–1120
- Benhidjeb T, Wilhelm T, Harlaar J, Kleinrensink GJ, Tom AJ, Schneider TAJ, Stark M (2008) Totally transoral video-assisted thyroidectomy (TOVAT)—First experimental results of a new surgical method. Presented at the 20th international conference of the society for medical innovation and technology (SMIT), Vienna, 28–30 August 2008
- Benhidjeb T, Wilhelm T, Harlaar J, Kleinrensink GJ, Tom AJ, Schneider TAJ, Stark M (2008) Totally transoral video-assisted thyroidectomy (TOVAT)—First experimental results of a new surgical method. *Minim Invasive Ther Allied Technol* 17:217
- Schiel R, Olthoff A, Kruse E (2005) Vergleichende Anatomie des N. recurrens bei Mensch und Schwein. Available at <http://www.egms.de/en/meetings/dgpp2005/05dgpp098.shtml>. Accessed 3 Jan 2011
- Caylor HD, Schlotthauer CF (1927) The thyroid gland of swine. *Anat Record* 34:331–339
- Bärlechner E, Benhidjeb T (2008) Cervical scarless endoscopic thyroidectomy: axillo-bilateral-breast approach (ABBA). *Surg Endosc* 22:154–157

12. Nakano S, Kijima Y, Owaki T, Shirao K, Baba M, Aikou T (2002) Thyroid anterior chest wall approach for video-assisted thyroidectomy using a modified neck skin lifting method. *Biomed Pharmacother* 56:96s–99s
13. Shimizu K, Kitagawa W, Akasu H, Hirai K, Tanaka S (2002) Thyroid video-assisted minimally invasive endoscopic thyroid surgery using a gasless neck skin lifting method—153 cases of benign thyroid tumors and applicability for large tumors. *Biomed Pharmacother* 56:88s–91s
14. Kitano H, Fujimura M, Kinoshita T, Kataoka H, Hirano M, Kitajima K (2002) Endoscopic thyroid resection using cutaneous elevation in lieu of insufflations. *Surg Endosc* 16:88–91
15. Miccoli P, Materazzi G, Berti P (2010) Natural orifice surgery on the thyroid gland using totally transoral video-assisted thyroidectomy: report of the first experimental results for a new surgical method: are we going in the right direction? *Surg Endosc* 24:957–958
16. Benhidjeb T, Wilhelm T, Harlaar J, Kleinrensink G-J, Schneider Tom AJ, Stark M (2010) Reply to: doi:[10.1007/s00464-009-0677-y](https://doi.org/10.1007/s00464-009-0677-y): Re: Natural orifice surgery on thyroid gland—totally transoral video-assisted thyroidectomy (TOVAT)—report of first experimental results of a new surgical method [2009 (23):1119–1120]. *Surg Endosc* 24:959–960