Evaluation of the efficacy of CT guided thoracic sympatholysis to treat palmar hyperhidrosis

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Abstract

Purpose and Method. Palmar hyperhidrosis is a pathological condition characterized by overspiration caused by any stress or emotion. We have evaluated the results of 101 CT guided sympatholysis procedures performed on 50 patients suffering from primary palmar hyperhidrosis.

Results. Mean follow up was 50 months (6 months to 8 years) for 87 procedures with immediate good results in 46 patients. Using actuarial analysis, 62% of patients had persistent good results after 50 months. Complications included one case of small pneumothorax requiring no treatment and one case of vagal syndrome. Pain or thoracic discomfort was reported by 14 patients and was relieved by aspirin within 24 hours. Six patients developed a Horner’s syndrome that resolved within a few weeks and six other patients developed moderate compensatory overspiration over the face, thorax or contralateral arm.

Conclusion. Based on our results, CT guided sympatholysis provides results similar to endoscopic thoracic sympathectomy and is associated with fewer risks.

Key words: Interventional radiology. Hyperhidrosis. CT guidance.

Materials and methods

Patients

Over a period of 8 years (1994-2002), 80 patients underwent a total of 170 CT-guided

Palmar hyperhidrosis is characterized by inappropriate overspiration secondary to minor stimuli (emotion, stress). About 1-2% of the general population is affected by this pathology, mainly younger female patients. Even though benign, hyperhidrosis may have significant social, personal and professional consequences (1). Overspiration is secondary to overstimulation of post-ganglionic cholinergic fibers from sympathetic ganglia of the latero-vertebral chain located at the T2-T3 level. The pathophysiology of hyperhidrosis is poorly known; it would be the result of sympathetic dysfunction either due to hyper-reactivity of sweat glands to stimuli or hyper-activity of the sympathetic system. Therapeutic options include:

- topical antiperspirants, poorly effective at the palmar level,
- oral medications (anticholinergic, anti-sudorific),
- iontophoresis (2) by which a soluble salt is introduced through intact skin by the application of a direct electrical current; the exact reasons for the efficacy of this procedure is not known,
- surgery, more aggressive, such as open thoracotomy or supra-clavicular sympathectomy, or the more recently introduced thorascopic sympathectomy.

Recent reports in the literature (3) regarding CT-guided sympatholysis with phenol have lead us to evaluate the results of this technique with a series of 101 such procedures in 50 patients with palmar hyperhidrosis.

Résumé

Évaluation de l’efficacité thérapeutique de la sympatholyse thoracique dans l’hyperhidrose palmaire sous contrôle tomodensitométrique

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Objectifs et méthodes. L’hyperhidrose palmaire se caractérise par une hypersudation inappropriée provoquée par le moindre stimulus (émotion, stress). Des essais récents de phénolisation sous contrôle tomodensitométrique nous ont conduit à évaluer les résultats de cette technique sur une série de 101 sympatholyses réalisées chez 50 patients souffrant de cette pathologie.

Résultats. Le suivi moyen a été de 50 mois (de 6 mois à 8 ans) et a porté sur les 87 sympatholyses ayant présenté un bon résultat immédiatement chez 46 patients. Exprimé de façon actuarielle, on a dénombré 62 % de bons résultats à 50 mois. Les incidents observés ont été la survenue d’un discret pneumothorax non drainé, d’un choc vagal. Des douleurs ou gênes thoraciques ont été observées chez 14 patients, ces douleurs étant calmées en 24 heures par des antalgiques mineurs. Six patients ont présenté un syndrome de Claude-Bernard-Horner totalement régressif en quelques semaines et 6 une hypersudation compensatrice modérée au niveau de la face, du thorax ou du membre controlatéral.

Conclusion. La sympatholyse chimique thoracique sous contrôle tomodensitométrique apparaît, dans notre étude, comme un traitement aussi efficace que la sympatholyse par voie endoscopique dans l’hyperhidrose palmaire avec moins de risques.

sympatholysis procedures. Patients were referred by the vascular surgery clinic. Thirty patients were lost to follow-up. Between July and September 2002, 50 patients, for a total of 101 sympatholysis procedures, were contacted for follow-up. This group included 39 females and 11 males with a mean age of 24.6 years (17-55 years):
- 9 patients underwent a single sympatholysis (8 right-sided and 1 left-sided),
- 34 patients underwent 2 procedures (35 right-sided and 33 left-sided) (bilateral sympatholysis),
- 4 patients underwent 3 procedures (7 right-sided and 5 left-sided) (bilateral sympatholysis with repeat procedure),
- 3 patients underwent 4 procedures (7 right-sided and 5 left-sided) (bilateral sympatholysis with 2 repeat procedures).

Relevant past medical history included:
- 19 patients had a family history of palmar hyperhidrosis,
- 36 patients had undergone prior therapeutic management including topical antiperspirants or oral medications (anti-cholinergic, anxiolytic),
- 31 had undergone prior iontophoresis treatments with unsatisfactory functional result.

The indication for sympatholysis was made by the vascular surgeons based on the debilitating nature of the overperspiration.

Technique (fig. 1)
The patients were kept NPO. Lab work included a coagulation profile. Premedication included 1 tab of hydroxyzine (Atarax) p.o. 1 hour prior to the procedure.

Patients were placed on the CT couch in the prone position with a pillow under their chest and arms extended over their head. A coronal scout CT image was obtained of the entire thoracic spine. After the T3 level was identified, the projected needle course was plotted on the screen with calculation of depth and angle in order to achieve needle tip placement along the lateral vertebral body margin ventral to the costo-vertebral gutter.

The procedure was performed under sterile technique following local anesthesia. A co-axial system was used: an 18G guide needle was first advanced through the chest wall musculature followed by placement of a 22G Chiba needle. The needle was advanced very slowly using frequent CT imaging to confirm adequate extrapleural needle position. Normal saline was injected with each needle step to widen the needle path to the lateral T3 vertebral body margin. After adequate needle tip positioning and contrast diffusion (Iopamiron) were confirmed, a total of 5 to 10 cc of phenol 6% solution was injected with calculation of depth and angle in order to achieve needle tip placement along the lateral vertebral body margin ventral to the costo-vertebral gutter.

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Efficacy criteria
Immediate efficacy criteria included observable venous vasodilation at the time of injection, skin dryness, and increased skin temperature. Immediate adverse effects and complications were also recorded.

Long-term results included observable findings as above as well as a subjective assessment from the patient as to whether or not they were satisfied with the result. Secondary adverse effects and complications, including compensatory sweating and Horner’s syndrome, were also recorded.

Results
Immediate Results
Technical failure
The procedure could not be completed in 4 patients due to epidural passage of contrast in all cases, 3 of which being scheduled for bilateral sympatholysis. The procedure was rescheduled at 1 month for 3 patients. One patient declined further attempts.

Immediate efficacy
This was evaluated while the patients were still in the CT room immediately after injection. A good result with skin dryness was observed in 87 cases whereas no change in symptoms was clinically apparent in 10 cases consistent with immediate failure of response.

Early adverse effects and complications
One patient had a small pneumothorax that required no treatment. One patient had a vagal reaction. Pain or thoracic discomfort was reported by 14 patients and was relieved by aspirin within 24 hours. Six patients developed a Horner’s syndrome that completely resolved within a few weeks and 6 patients developed moderate compensatory sweating over the face, thorax or contralateral limb.

Fig. 1: Technique du guidage.

Follow-up interval and results
A total of 87 sympatholysis procedures with immediate good results were followed-up:
- 2 cases have a follow-up of only 6 months: both have satisfactory result,
- 7 cases have a follow-up of 1 year: 6 have persistent satisfactory result,
- 2 cases have a follow-up of 2 years: none have persistent satisfactory result,
- 19 cases have a follow-up of 3 years: 9 have persistent satisfactory result,
- 13 cases have a follow-up of 4 years: 8 have persistent satisfactory result,
- 27 cases have a follow-up of 5 years: 13 have persistent satisfactory result,
- 13 cases have a follow-up of 6 years: 2 have persistent satisfactory result,
- 4 cases have a follow-up of 7 years: 3 have persistent satisfactory result,
- 7 cases have a follow-up of 8 years: 3 have persistent satisfactory result.
Overall, 46 cases have persistent satisfactory result.

Results based on mean follow-up interval
The mean follow-up interval was 50 months (6 months–8 years) for 87 procedures with immediate satisfactory result in 46 patients. Using an actuarial model, the rate of persistent satisfactory result at 50 months was 62% (Fig. 2).

Compensatory sweating
Eight of 46 patients reported the presence of moderate compensatory sweating over the face, thorax or armpit or limb. The mean time delay before onset was 2 months.

Discussion
This technique, first described about 20 years ago (3), has already been used for cases of palmo-planar hyperhidrosis (4) and cases of upper limb arteriopathy (5). Until now, the alternative for patients with failed medical management was surgical sympathectomy. Initially performed from a supraclavicular approach, this technique had success rates ranging between 90-100% but was associated with complications (6, 7): Horner’s syndrome mainly due to lesions of the stellate ganglion, postsurgical neuralgia, pneumothorax and hemothorax. The axillary approach (8) through the second or third intercostals space allow access to the 2nd, 3rd and 4th sympathetic ganglia without interfering with the stellate ganglion hence decreasing, yet not entirely excluding, the risk of Horner’s syndrome.

More recently, endoscopic sympathectomy (9, 10) allows destruction of the sympathetic ganglia under direct real time visualization. Immediate results are good (11-13). This procedure is performed under general anesthesia and the morbidity is low. Pulmonary complications are reported in 1.5-4.0%, mainly hemothorax (14). Immediate satisfactory result is reported in 92% of cases, and Linel (15) reported persistent satisfactory result in 63% of cases after a mean follow-up of 60 months in 76 patients.

Compensatory sweating is one of the main adverse effects of sympathectomy, especially surgical sympathectomy. Unpredictable, and of uncertain pathophysiology, it is reported in 37-75% of patients and typically involves the trunk and thighs (16).

In our study, immediate satisfactory result occurred in 90% of cases, with persistent satisfactory result after a mean follow-up interval of 50 months occurred in 62% of cases with no complication except for entirely reversible cases of Horner’s syndrome.

Conclusion
Performed under local anesthesia, CT guided thoracic sympatholysis is a simple procedure that, based on our results, appears as effective as endoscopic thoracic sympathectomy for the management of palmar hyperhidrosis with fewer associated risks and adverse effects, especially compensatory sweating.

Well tolerated by patients and associated to low morbidity, chemical sympatholysis is an alternative to surgical sympathectomy. However, we believe that repeat CT guided sympatholysis should not be performed for patients who did not favorably respond after a first attempt. Endoscopic sympathectomy should be considered for these patients.

References
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