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ORIGINAL ARTICLE

Uniportal Versus Biportal Video Assisted Thoracoscopic Sympathectomy for primary hyperhidrosis

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Abstract

Background: The evolving thoracoscopy approach enhanced the thoracoscopic sympathectomy to become the surgical technique of choice for treating primary hyperhidrosis. **Objective:** To compare the results of 1ry hyperhidrosis patients treated by uniportal and biportal sympathectomy. **Methods:** In a Randomized control study, 36 cases were included complaining of signs and symptoms of hyperhidrosis, 18 of them underwent uniportal sympathectomy and 18 were managed by biportal sympathectomy in Cardio-thoracic Surgery Department, Faculty of Medicine, Zagazig University Hospitals. **Results:** There is a significant increase in operative time in the biportal group as compared to the uniportal one with p p-value < 0.0001. There is a significant increase in postoperative pneumothorax with p value = 0.0191 and intercostal chest tube insertion with p value= 0.0455 in the bipotal group. There is a significant increase in pain scores in the biportal group in comparison with the uniportal group. There is no significant difference in pain score between both groups after 3 months of the operation. There are no patients with pain scores of more than 1 after 3 months of the operation. There is a significant increase in patient satisfaction with the scar in the uniportal group compared to the biportal group with p value <0.0001 regarding the mean of both groups. **Conclusion:** Uniportal Video-Assisted Thoracoscopic Sympathectomy (VATS) sympathectomy may be better than biportal VATS sympathectomy in the management of primary Palmar hyperhidrosis as it takes less operative time with more patient satisfaction and minimal scar with minimal complication compared to biportal VATS sympathectomy.
Keywords: Video-Assisted Thoracoscopic Sympathectomy; Biportal; Uniportal.

INTRODUCTION

Primary hyperhidrosis is defined by the overproduction of sweat in reaction to environmental or emotional triggers beyond what is considered normal. Primary palmar hyperhidrosis has an equal gender prevalence incidence of 4.36 percent among adolescents. Axillary and palmar hyperhidrosis can be debilitating. The patient's personal and professional relationships often suffer as a result **[1]**. Hyperhidrosis can affect the entire body or just one specific area. Primary hyperhidrosis, also known as focal hyperhidrosis, is characterized by excessive sweating in specific areas of the body (such as the palms, soles, face, axilla, and scalp). Generalized hyperhidrosis, also known as secondary hyperhidrosis, is a condition characterized by excessive sweating on a systemic scale. Some underlying illnesses, such as hyperthyroidism, hyperpituitarism, diabetes, pregnancy, or emotional problems, are usually the cause **[2]**. Primary hyperhidrosis (PH) has yet to have a definitive cause identified. Hyperhidrosis most commonly occurs in the palms of the hands (25% of cases), the axilla (20%), or both (55% of cases), and the soles of the feet (45% of cases) **[3, 4]**. Several drugs, including topical treatments and botulinum toxin injections into nerve ends, are used to treat these patients. Radiofrequency thermotherapy has evolved as a new method of treatment in recent years **[5, 6]**. In the 1920s, surgeons began using trans-thoracotomies, a procedure associated with high rates of patient morbidity. It was unable to win over the public **[7]**.

Thanks to advancements in thoracoscopy, thoracoscopic sympathectomy has surpassed all others as the gold-standard surgical treatment for primary hyperhidrosis. The success rate, morbidity, and length of hospital stay for this minimally invasive surgery are all good **[8]**. Rarely do we see complications during this treatment which are Horner syndrome, pneumothorax, and compensatory hyperhidrosis. Either one or two ports are required for the surgery **[9]**.

This study aims to compare the results of 1ry hyperhidrosis patients treated by uniportal and biportal sympathectomy.

SUBJECTS AND METHODS

Thirty-six cases complaining of signs and symptoms of hyperhidrosis, we included patients who underwent VATS sympathectomy for grade 3, and 4 hyperhidrosis in this Randomized control study. Assuming that all cases met the inclusion and exclusion criteria were included. During the study period (6 months), 6 cases/month, 36 cases were included as a comprehensive sample, and ethical approval and consent were taken from all patients for documentation and to be included in this study which was done at Cardio-thoracic Surgery Department, Faculty of Medicine, Zagazig University Hospitals.

After institutional review board approval of IRB (9972/16-10-2022), written informed consent was obtained from all participants. The study was done according to The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Inclusion criteria

Cases with grade 3, 4 hyperhidrosis primary hyperhidrosis according to hyperhidrosis disease severity scale or previous failure of medical treatment.

Exclusion criteria

We excluded all the following cases: previous thoracic surgery with adhesion, any disease affecting sweating as thyroid problems, infection, or diabetes, cases who used any drug causing hyperhidrosis as cholinesterase inhibitors, opioids, or tricyclic antidepressants, cases with any disease affecting sweating as thyroid problems, infection, or diabetes, and cases who used any drug causing hyperhidrosis as cholinesterase inhibitors, opioids, or tricyclic antidepressants.

Patients were divided into two groups, one for each of the two treatment modalities.

Pre-operative preparation

All patients were considered to: Complete history taking including: Age, sex, occupation, history of night sweating for no apparent cause, palmer sweating affecting daily activities, numbness. General and local examination: that included: Vital signs (blood pressure, heart rate, respiratory rate, body temperature); general look (Palmer over sweating). Radiographic assessment involving: Chest X-Ray. Laboratory studies included: Complete blood count (CBC), coagulation profile, kidney function test (KFT), and liver function test (LFT) as preparation for surgery.

Surgical maneuvers

One of the two study groups underwent uniportal VATS sympathectomy, and the other underwent biportal VATS sympathectomy. We place a 5-mm port for the instruments in the 2nd or 3rd intercostal space of the midaxillary line and another 10-mm port for the camera in the biportal technique. In the uniportal technique, we place one port 10 mm for both the camera and instruments.

Post-operative and Meticulous follow up.

Both study groups were followed up in the early and late postoperative course. Data are collected concerning; Pain score using visual analogue pain scale (0-10), wound infection and sepsis, postoperative stay in hospital, symptoms and signs of remission, patient satisfaction, any complication (Horner syndrome, pneumothorax), and compensatory hyperhidrosis.

STATISTICAL ANALYSIS

All data were collected, tabulated, and statistically analyzed using SPSS 26.0 for Windows (SPSS Inc., Chicago, IL, USA). Quantitative data were presented as mean ± standard deviation and range and qualitative data were presented as numbers and percentages. Quantitative data were compared using a t-test or Mann–Whitney test if not normally distributed, and qualitative data were compared using the chi-square test or Fischer's Exact test if the frequency of the events is less than 5. The level of P-value ≤ 0.05 indicates a significant difference.

RESULTS

There is no significant difference between uniportal and biportal subjects as regards demographic measures. There is an increase in females in the study

in comparison to males in both study groups (Table 1).

There is a significant increase in operative time in the biportal group as compared to the uniportal one with p p-value < 0.0001. There is a significant increase in postoperative pneumothorax with p value = 0.0191 and intercostal chest tube insertion with p value= 0.0455 in the bipotal group, (Table 2).

There is a significant increase in pain scores in the biportal group in comparison with the uniportal group. There is no significant difference in pain score between both groups after 3 months of the operation. There are no patients with pain scores of more than 1 after 3 months of the operation (Table 3). There is a significant increase in pneumothorax in the biportal group (Table 4). There is a significant increase in wound length in the biportal group (Table 5). There is a significant increase in patient satisfaction with the scar in the uniportal group compared to the biportal group with p value <0.0001 regarding the mean of both groups, (Table 6).

Table 1: Demographic data of patients for each group.

		Uniportal (N =18)	Biportal (N =18)	P-Value
Age		21.3±3.5 Range (7-30)	21.5±3.4 (8-35)	0.863
Sex	**Male (36%)**	7	6	0.728
	Female (64%)	11	12	
Weight		58.61±16.85 (22-83)	56.56±16.88 (23-84)	0.7169
BMI, Kg/m^2 (Range)		20.2±3.3 (16.4 – 24.5)	22.5±5.4 (17.2 – 25.8)	0.13235

BMI: Body mass index

Table 2: Procedure data for each group.

	Uniportal (N =18)	Biportal (N =18)	P-Value
Operative time (Minutes)	35.5±4	45.8±3.5	<0.0001*
Hospital stays (days)	1±0.5	1.1±0.5	0.4044
Post operative pneumothorax	0	6 (33.33%)	0.0191*
Intercostal chest tube	0	5 (27.78%)	0.0455*
Compensatory hyperhidrosis	10 (55.56%)	11 (61.11%)	0.73532
Horner syndrome	0	0	-
Mortality	0	0	-

Table 3: Distribution of patients in both groups first day post operative and after 3 months as regard to pain scale.

Pain Scale (0 - 5)	Uniportal (N =18)	Biportal (N =18)	P-Value
1st day post operative			
0	0	0	-
1	0	0	-
2	5 (27.78%)	0	0.0455*
3	10 (55.56%)	7 (38.89%)	0.3166
4	3 (16.67%)	11 (61.11%)	0.0153*
3 months post operative			
0	16 (88.88%)	14 (77.77%)	0.3711
1	2 (11.11%)	4 (22.22%)	

Table 4: Complications happened in each group after the procedure.

	Uniportal (N =18)	Biportal (N =18)	P-Value
Horner syndrome	0	0	<0.05 *
Wound infection	0	0	-

Table 5: Total wound length in each group by centimeter (cm).

	Uniportal (N =18)	Biportal (N =18)	P-Value
3 - 4 cm	10 (55.56%)	0	0.0003*
5 - 6 cm	8 (44.44%)	0	0.0029*
7 - 8 cm	0	11 (61.11%)	<0.0001*
9 - 10 cm	0	7 (38.89%)	0.0076*

Table 6: Patient satisfaction of scar (cosmetic appearance) 1(minimal scar), 5 (significant scar).

	Uniportal (N =18)	Biportal (N =18)	P-Value
1	5 (27.78%)	0	0.0455*
2	12 (66.67%)	7 (38.89%)	0.0951
3	1 (5.56%)	11 (61.11%)	0.0004*
4	0	0	-
5	0	0	-
Mean ± SD	1.7±0.2	2.6±0.2	<0.0001*

DISCUSSION

To combat this increase in body temperature, perspiration is essential. Sweating more than is required for normal physiological thermoregulation is the hallmark of hyperhidrosis, often known as excessive sweating. Most cases are primary (cryptogenic) and its underlying cause is unknown; this is not to say that it cannot have a psychological or physiological origin. Primary hyperhidrosis can affect any portion of the body; however, it typically affects only one or a small number of areas. Primary focal hyperhidrosis (PFH) often manifests as excessive and symmetrical sweating of the palms, axillae, and soles of the feet **[10]**.

Several drugs, including topical treatments and botulinum toxin injections into nerve ends, are used to treat these patients. Radiofrequency thermotherapy has evolved as a new method of treatment in recent years. **[11]**. In our study there was no difference between uniportal and biportal groups as regard age, sex, or BMI data however there was a significant increase in females compared to males in both study groups (64% females and 36% males). This agreed with **Chen et al. [12]** study, which compared the effectiveness of uniportal and biportal VATS sympathectomy for hyperhidrosis. In our study, we found that there was a significant increase in operative time in the biportal group compared with the uniportal group. This agrees with the study of **Chen et al. [12]**, which found that there was a significant increase in operative time in the biportal group compared with the uniportal group. Hand on hand **El-Hag-Aly et al. [13]** found that uniportal VATS sympathectomy operative time is 35 minutes. In our study, there is a significant increase in post-operative pneumothorax in the biportal group compared to the uniportal group. Our study revealed that post-operative pneumothorax is not detected in uniportal VATS sympathectomy, that agrees with **Ibrahim et al. [14]** who studied bilateral uniportal VATS sympathectomy and concluded that there was no relation between the uniportal procedure and incidence of pneumothorax. In controversy, **Chen et al. [12]** found that there was no significant difference between uniportal and biportal VATS sympathectomy, this may be operator dependent because of insufficient Valsalva maneuver in the bilateral group. In our study, we found that there was no occurrence of Horner syndrome in both groups of VATS sympathectomy. In the same line, an Egyptian study by **Atwaa et al. [15]** concluded that there was no relation between bilateral VATS sympathectomy and Horner syndrome. Hand on hand **Ibrahim et al. [14]**, found that there was no relation between

uniportal VATS sympathectomy and the incidence of Horner syndrome, which agrees with our study.

In our study, there is an increase in intercostal chest tube insertion in the biportal group in comparison to the uniportal group. The previous findings disagreed with the result of **Chen et al. [12]** in which there is no significant difference between both groups, this may be due to operator-dependent factor as insufficient Valsalva maneuver before the closure of the incision to empty the thoracic cavity from any residual air.

In contrast, a study by **Atwaa et al. [15]** concluded that the incidence of postoperative pneumothorax in bilateral VATS sympathectomy is not significant. In our study, there was a significant increase in pain scores in the biportal group in comparison to the uniportal group. This finding agreed with the study, which found an increased pain score in the biportal group compared with the uniportal one. This is due to less tissue damage in the uniportal group to open one port in comparison with the biportal group in which there is more tissue damage to make two ports open in the tissue **[12]**. Hand on hand **Atwaa et al. [15]** there were no mortality cases in bilateral VATS sympathectomy, which agrees with our results, this is because our intervention in this case is far away from any vital structure and the use of VATS is considered a minimal invasive maneuver. In our study, there was a significant increase in patient satisfaction with post-operative scars in the uniportal group in comparison with the biportal group as there is a decrease in total scar length in the uniportal group compared to the biportal group. In our study, there was no significant difference in patient satisfaction in the uniportal group compared with biportal one. This agrees with the study of **Chen et al. [12]** as regards overall patient satisfaction with the operation as there is no significant difference between the uniportal and biportal group. Hand on hand **Elmallah et al. [16]** found that there is no wound infection in biportal VATS sympathectomy, which agrees with our study results, this is due to minimal tissue damage in both groups as the use of VATS is considered a minimal invasive maneuver. Our result agrees with **Atwaa et al. [15]**, which concluded that there was no wound infection in bilateral VATS sympathectomy.

Limitations

Generalizability concerns could be raised by the study's limited sample size of people from similar socioeconomic backgrounds.

CONCLUSIONS

Uniportal Video-Assisted Thoracoscopic Sympathectomy (VATS) sympathectomy may be better than biportal VATS sympathectomy in the management of primary palmar hyperhidrosis as it takes less operative time with more patient satisfaction, minimal scar, and minimal complication compared to biportal VATS sympathectomy.

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