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Clipping versus Division of Sympathetic Chain in Thoracoscopic Sympathectomy for Treatment of Primary Palmar Hyperhidrosis

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Clipping versus Division of Sympathetic Chain in Thoracoscopic Sympathectomy for Treatment of Primary Palmar Hyperhidrosis

General Surgery

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ABSTRACT

Background: The most successful therapy for palmar hyperhidrosis (PH) has been established as endoscopic thoracic sympathectomy. In this research, sympathetic chain interruptions have been compared on the basis of whether the clipping or division by ablation method used to have an influence on the long-term results of patients who received thoracoscopic sympathectomy for primary PH.

Aim of the work: To evaluate the efficiency, safety, advantages and disadvantages of thoracoscopic sympathetic chain Division versus thoracoscopic sympathetic chain clipping in management of primary palmar hyperhidrosis.

Patients and methods: A prospective randomized clinical trial was conducted from March 2021 to November 2021 in the AL-Azhar University Hospitals' Department of General Surgery (AL-Hussein and Sayed Galal) in Cairo, Egypt, involving twenty eligible consecutive people who suffer from primary palmar hyperhidrosis who were managed with bilateral, thoracoscopic sympathectomy by cutting the sympathetic chain (group A) or applying endo-clips (group B).

Results: In terms of hand dryness after 24 hours, there was a highly statistically significant difference between the groups investigated. In group A, all patients showed significant dryness of the hand on the spot or within the first 24 hours, while only 1 (10%) patient in group B showed complete dryness within the first 24 hours. In group B, 8 (80%) patients showed nearly dry hand and 1 (10%) patients showed wet hand on spot.

Conclusion: Endoscopic sympathetic block (ESB) is at least as effective as endoscopic thoracic sympathectomy in the therapy of primary palmar hyperhidrosis, but ESB has the advantage of reversibility.

Keywords: *sympathectomy ; quality of life ; hyperhidrosis.*

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INTRODUCTION

Primary palmar hyperhidrosis (PH) is a condition that is idiopathic and may be embarrassing socially, emotionally, and professionally. The sympathetic nervous system innervates eccrine sweat glands, which are responsible for PH development. Excessive sweating can be caused by increased sympathetic activity, which happens spontaneously or as a result of an inappropriate central response to increasing temperature or emotional disturbances.[1]Conservative therapy of PH, like medicine (anticholinergic medications), Botox, or iontophoresis, generally gives transient relief, and such nonsurgical therapies are not without related adverse impacts**.** [2,3] The surgical PH treatment (video-thoracoscopic sympathectomy) has been shown to be effective and dependable.[4,5] Patient dissatisfaction using sympathectomy, on the other hand, has prompted a rethinking of the surgical strategy. Compensatory hyperhidrosis (CH) has been shown to affect patient satisfaction and life quality. The procedure was developed in order to improve patient satisfaction, and it now has a high rate of success and fewer negative impacts. [6] For individuals experiencing palmar and palmoaxillary sweating, limited sympathetic chain disruptions below the R2 ganglion level were indicated to minimize reduce CH.[7] In spite of the fact that both approaches offer good outcomes if the amount of division is right, there is a controversy about the optimal surgical method for sympathectomy if disruption by electrocautery or blockade using clips must be employed. While contentious, clipping's potential for reversibility makes it a better option than cauterization. In this work, we compared the effectiveness, recurrence, and reversibility of sympathetic chain disruption approaches.

PATIENTS AND METHODS

A total of twenty eligible consecutive patients with primary palmar hyperhidrosis were managed using a bilateral, thoracoscopic approach in a prospective and randomized clinical study carried out from

January 2021 to November 2021 at the AL-Azhar University Hospitals' Department of General Surgery (AL-Hussein and Sayed Galal) in Cairo, Egypt. Ten patients underwent sympathetic chain cutting (group A), and the other ten patients were applyed endo-clips over the sympathetic chain (group B). All patients underwent a thorough history and physical exam, as well as routine pre-operative investigations (CBC, ALT, AST, serum creatinine, INR), and pre-operative antibiotic prophylaxis. A double-lumen endotracheal tube was used to perform thoracoscopic sympathetic surgery while the patient was in a supine location, having both arms lifted and supported to 90° under general anesthesia. A 10-mm, 30° telescope has been inserted through the first port, which has been inserted into the level of the fifth intercostal space's mid-axillary line. Another port was inserted in the anterior axillary line at the fourth intercostal space, with a port size of 5 mm in group A for the insertion of endoscopic instruments and a port size of 10 mm in group B for clip appliers. The lung will then be progressively deflated by inserting 1,500–1,700 mL of CO2 gas into the thoracic cavity. The costal pleura will be opened across the major sympathetic trunk employing diathermy. In group A, the sympathetic chain has been dissected by diathermy at the level of the superior border of the second and third ribs; in group B, the sympathetic chain was clipped at the same level employing an endoclip (Ligaclip, Ethicon, USA); in both groups A and B, the putative bypass nerve fibers were amputated, extending the transection range by roughly 3 cm laterally across the relevant rib surface. A 10-Fr chest tube has been inserted into the pleural cavity, the lung has been inflated, and the chest tube has been withdrawn after air escape ceased. We generally performed the surgery on the right side first, then the contralateral site. The majority of patients have been discharged on the same day or the following day after a routine chest x-ray has been done for them and the follow-up parameters were: dryness of the hand within 24 hours, dryness of the combined hand and axilla, compensatory sweat appearance after surgery, patient satisfaction, and the occurrence of complications, e.g., manifestations of Horner syndrome.The IBM SPSS software package version 20.0 has been employed to analyze the data that was supplied to the computer. (Armonk, NY: IBM Corp). Numbers and percentages have been employed to describe qualitative data. Range (min and max), mean, standard deviation, and median have been employed to describe quantitative data. The significance of the acquired findings has been determined at the 5% level. The tests performed were the chi-square test for categorical variables and the Monte Carlo correction for chi-square when more than 20% of the cells had an anticipated count of less than 5. To compare two examined groups, use the Student t-test for normally distributed quantitative variables.

RESULTS

Demographic data-based distribution of the examined cases: (table 1)

Our sample included a total of 20 eligible patients with a mean age 20.40 ± 2.3 years, randomized into two equal groups that were statistically matched. Of them, 55% were males. All patients had bilateral hyperhidrosis, 25 % had only palmar hyperhidrosis and 75% had combined hyperhidrosis (palmar plus either axillary or plantar or both).

		Group A (N = 10)		Group B (N = 10)		Stat. test	P-value
Age (years)	**Mean ±SD**	21.6 ± 3.02		21 ± 2.2		T = 0.51	0.616 NS
	Range	17 - 26		18 - 24			
Sex	**Male**	6	60%	5	50%	X^2 = 0.2	0.653 NS
	Female	4	40%	5	50%		
Side	**Unilateral**	0	0%	0	0%	-----	-----
	Bilateral	10	100%	10	100%		
Site	**Palmar**	3	30%	2	20%	X^2 = 0.26	0.606 NS
	Combined	7	70%	8	80%		

Table 1: Comparison of examined groups based on demographic data.

T: independent sample T test. NS: p-value > 0.05 is deemed non-significant.

X2: Chi-square test.

This table shows no statistically significant difference (p-value > 0.05) between examined groups based on demographic data (age, sex, side and site). As regard age, the mean age in group A was 21.6 ± 3.02 years with minimum age of 17 and maximum age of 26 years while the mean age in group B was 21 ± 2.2 years with minimum age of 18 and maximum age of 24 years. As regard sex, there were 6 men (60%) and 4 women (40%) in group A while there were 5 males (50%) and 5 females (50%) in group B. As regard laterality, all studied patients (100%) in both groups were bilateral. As regard site, there were 3 palmer (30%) and 7 combined (70%) in group A while there were 2 palmer (20%) and 8 combined (80%) in group B.

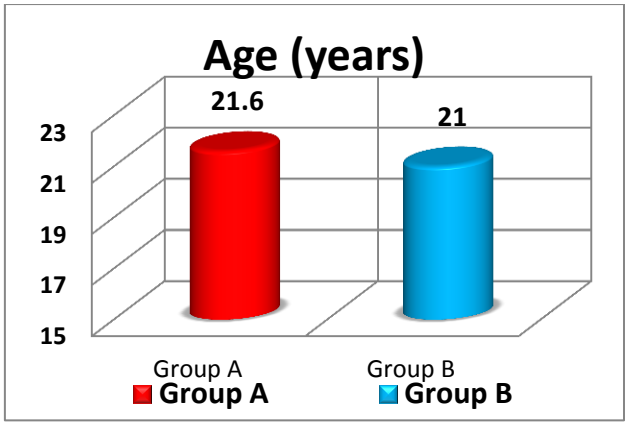

Fig. 1: Comparison between the study groups in terms of age.

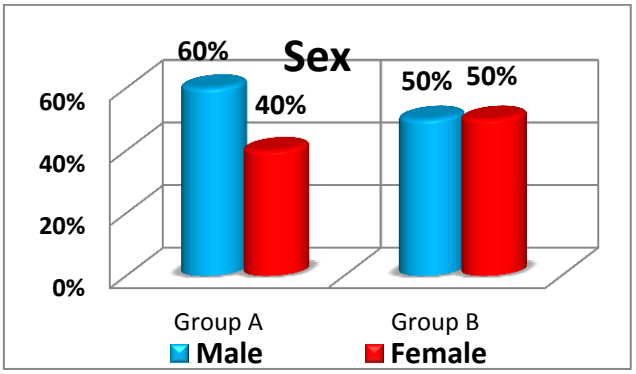

Fig. 2: Comparison between the study groups in terms of sex.

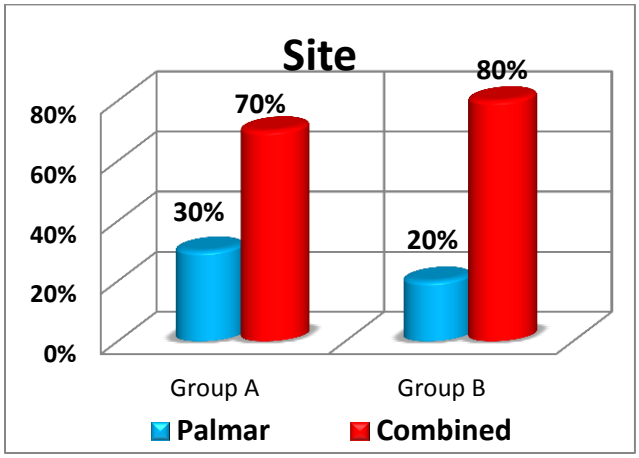

Fig. 3: Comparison between the study groups in terms of site

		Group A (N = 10)		Group B (N = 10)		Stat. test	P-value
Intra-operative bleeding	No	9	90%	10	100%	X2 = 1.05	0.304 NS
	Yes	1	10%	0	0%		
Conversion to thoracotomy	No	10	100%	10	100%	-----	-----
	Yes	0	0%	0	0%		
Intra-operative chest tube insertion	No	9	90%	10	100%	X2 = 1.05	0.304 NS
	Yes	1	10%	0	0%		
Superficial wound infection	No	9	90%	10	100%	X2 = 1.05	0.304 NS
	Yes	1	10%	0	0%		
Horner's syndrome	No	10	100%	10	100%	-----	-----
	Yes	0	0%	0	0%		

Table 2: Comparison between the study groups based on complications.

X2: Chi-square test. NS: p-value > 0.05 is deemed non-significant.

This table shows no statistically significant difference (p-value > 0.05) between the examined groups based on complications (intra-operative bleeding, conversion to thoracotomy, intra-operative chest tube insertion, superficial wound infection and Horner's syndrome). No patient in both groups developed Horner syndrome or converted to thoracotomy. in the group A one patient (10%) who had bleeding intraoperative. This patient later on developed superficial wound infection (10%). Also one patient (10%) needed chest tube insertion intra-operatively instead of tubeless operation.

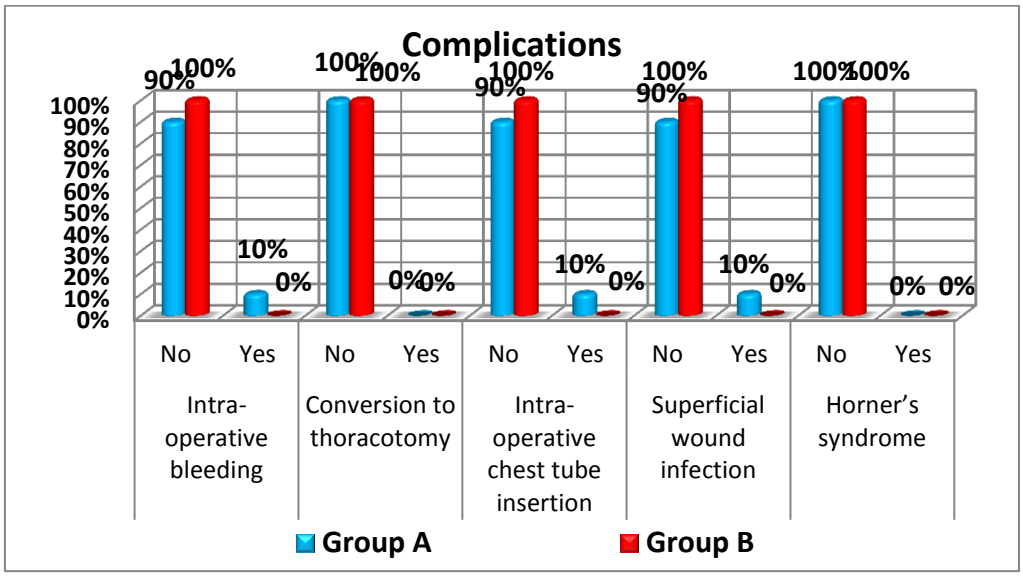

Fig. 4: comparison between the study groups based on complications.

		Group A (N = 10)		Group B (N = 10)		Stat. test	P-value
Dryness of hand within 24 hour	**Dry**	10	100%	1	10%	**X^2 = 16.4**	**0.0002 HS**
	Nearly dry	0	0%	8	80%		
	Wet	0	0%	1	10%		
Dryness of combined hand and axilla	**No**	0	0%	2	20%	X^2 = 2.22	0.136 NS
	Yes	10	100%	8	80%		
Compensatory sweat	**None**	1	10%	4	40%	X^2 = 6.11	0.106 NS
	Mild	7	70%	4	٤0%		
	Moderate	1	10%	2	20%		
	Severe	1	10%	0	0%		
Patient satisfactions	**Satisfied**	7	70%	9	90%	X^2 = 1.58	0.453 NS
	Partly satisfied	2	20%	1	10%		
	Unsatisfied	1	10%	0	0%		

Table 3: comparison between the study groups based on treatment success follow up.

HS: p-value < 0.001 is deemed highly significant.

X2: Chi-square test. NS: p-value > 0.05 is deemed non-significant.

This table shows:

Based on dryness of hand after 24 hours, there was a highly statistically significant difference (p-value < 0.001) between the examined groups. In group A, all patients 10 (100%) showed significant dryness of the hand on the spot or within the first 24 hours, while only 1 (10%) patient in group B showed complete dryness within the first 24 hours (p= 0.0002). In group B, 8 (80%) patients showed nearly dry hand and 1 (10%) patients showed wet hand on spot or in the first 24 hours.

There was no statistically significant difference (p-value > 0.05) between the examined groups based on dryness of combined hand and axilla, compensatory sweat, and patient satisfaction.

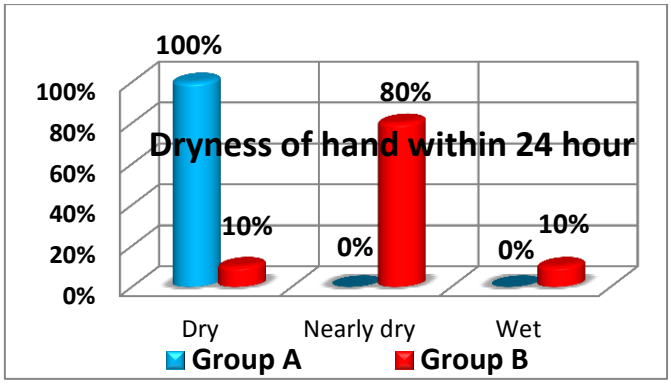

Fig. 5: comparison between the study groups based on the dryness of hand within 24 hour.

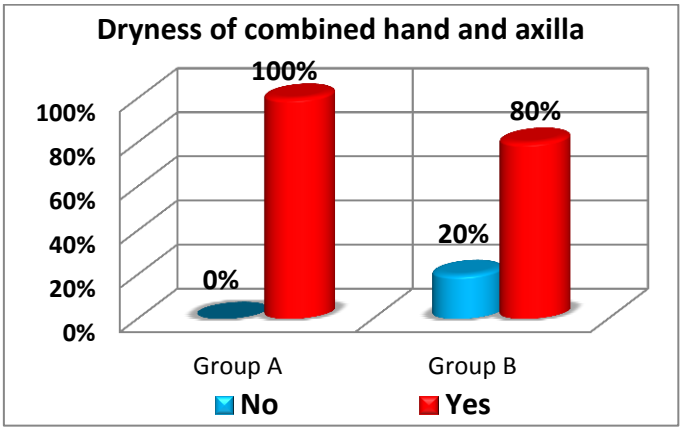

Fig.6: Comparison between the study groups based on dryness of the combined hand and axilla.

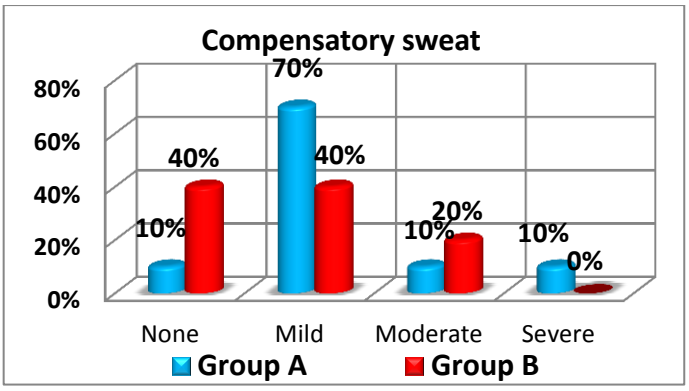

Fig. 7: Comparison between the study groups based on compensatory sweat.

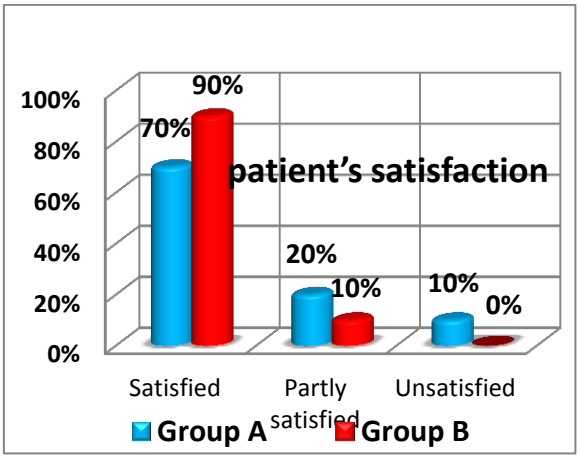

Fig. 8: Comparison between the study groups based on patient satisfaction.

DISCUSSION

Hyperhidrosis of the palms, plantars, and axillae is a clinical disorder that can be quite frustrating in social life. For palmar and axillary hyperhidrosis treatment, ETS is currently the most efficient, safest, and least invasive therapeutic approach. ETS is commonly done with general anaesthesia with sympathetic cauterization of the sympathetic chain at levels 2 and 3 of the thoracic ganglia, or with a clipping technique. In various trials, ETS has been used to treat palmar and axillary hyperhidrosis. The bulk of such investigations, though, accomplished sympathectomy by cauterizing sympathetic ganglia at the thoracic 2–3 level.[8] Research by Kocher et al compared the two most commonly used procedures for thoracic sympathectomy: transection (ETS) and clipping (ESB). A total of 63 people who had rib-oriented sympathectomy, either by transection (n = 36, 57 percent) or clipping (n = 27, 43 percent), were included in this retrospective analysis. All patients have been typically discharged the same day, approximately 4–5 hours following surgery. According to their findings, clipping is less successful than sympathetic chain transection in the therapy of hyperhidrosis and facial flushing. The therapy of palmar hyperhidrosis had the highest success rate at 98% (40 of 41 patients), followed by face flushing at 81% (13 of 16 patients). Technical mistakes (cutting/clipping one level too low) were responsible for all three failures in the therapy of face flushing. Axillary hyperhidrosis was shown to have inadequate therapy, with just 38% of patients improving (9 of 24 patients).[9]In ETS group of our study, all patients 10 (100%) showed significant dryness of the hands and axillae on spot while in ESB group B 8 (80%) patients showed nearly dry hand and axillae and only 1 (10%) patient showed complete dryness within the first 24 hours and 1 (10%) patients showed wet hand on spot and this is explained by the long period taken to show the effect on the sympathetic chain caused by the clip.Despite the fact that CH is uncommon following ETS, Cardoso et al. and Baroncello et al. noted that it is minor in most patients and does not create as much discomfort in patients' social lives as primary hyperhidrosis.[10]According to many researchers, reaching numerous levels of the sympathetic chain appears to lead to an increasing incidence of severe CH. Moreover, it was demonstrated that the R2 segment's involvement has an impact on CH rates as well as severity. Based on the patients' underlying condition, the best level to treat is still being debated in the international literature, although evidence is mounting that for face flushing, attaining the R2 level appears to be necessary.[11]In our study, regarding group A (ETS) 9 patients (90%) had compensatory hyperhidrosis, one of them (10%) suffered from moderate symptoms, another one (10%) suffered from severe symptoms while the other patients (70%) suffered from mild symptoms. While in group B (ESB), 4 patients (40%) suffered only from mild compensatory hyperhidrosis and 2 patients (20%) suffered from moderate symptoms.

Dias et al. investigated the quality of life (QoL) in 54 individuals having ETS operations at the level of T3–T4 following 30 and 180 days following surgery. The authors revealed that 93% of the patients had a significant enhancement in QoL. Dias et al. also mentioned that patients with hyperhidrosis are afraid and ashamed of their excessive sweating, which might lead to social anxiety. Following the procedure, the same set of patients stated that they were happy.Furthermore, they had regained their confidence.[12]

In our study, only 1 (10%) patient was unsatisfied with the procedure. He was from the ETS group, as he developed severe compensatory hyperhidrosis and he knew that the sympathetic chain cutting is irreversible. The other 18 (80%) patients were satisfied with the procedure as there was a noticeable enhancement in their quality of life.Another critical consideration is the operation's reversibility, particularly given that not only CH, but also other serious incidents or complications, like symptomatic bradycardia in conjunction with exercise intolerance or the incidence of Horner's syndrome, might only be managed by reversing the process. Lin et al. were the first to describe the use of clips on the sympathetic chain without requiring its transection. In addition, the chances of success were equivalent to those of other more invasive methods, although in the event of reversal, a relatively simple thoracoscopic excision of the clips would suffice instead of a complex reconstruction operation.[13] All of the pertinent known data on clip elimination in human patients came from four trials; clearly, a rate of success of 48–77% has been recorded, with success characterized as a reduction in CH and, as a result, an improvement in patient satisfaction[14]Greater rates of CH, and hence a greater rate of requested reversal operations, have also been reported in these investigations when elevated concentrations such as R2 and R3 have been addressed during the initial surgery.[15]

AS for reversibility of the procedure, our study did not cover it, as for the short time of the study and no patient requested clips removal.

There are various limitations to our research. The population's modest size was the most significant constraint. Our research about ESB procedure by clipping at T 2,3 levels, which does not compare our results with the different levels blockade. Nonetheless, this research has been conducted at a single university, including patients having identical demographic information in both groups and the same team of surgeons, with its associated effect on patient choice and standardized operational method, rendering the outcomes of the two groups highly comparable. Intraoperative surveillance (e.g., with a temperature probe, psudometry, etc.) can be employed in the future to evaluate the procedure's efficacy.

CONCLUSION

In the therapy of primary palmar hyperhidrosis, endoscopic sympathetic block (ESB) is at least as effective as endoscopic thoracic sympathectomy (ETS), but the ESB has the advantage of

reversibility. There is no statistically significant difference between the two groups in terms of compensatory hyperhidrosis. However, the incidence of severe compensatory hyperhidrosis is more in ETS group. The two groups achieve the same patient satisfaction and the same life quality.

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