Indian J Otolaryngol Head Neck Surg
(January–March 2013) 65(1):20–23; DOI 10.1007/s12070-012-0577-7

ORIGINAL ARTICLE

Lidocine Infiltration Test: An Useful Test in the Prediction of Results of Styloidectomy for Eagle's Syndrome

Ankit A. Singhania · Nirali V. Chauhan · Ajay George · Kayedjohar Rathwala

Received: 26 May 2012 / Accepted: 5 October 2012 / Published online: 17 October 2012

Abstract Eagle's syndrome is caused by elongated styloid process. Its accepted treatment is styloidectomy. However more than one-fourths of patients undergoing styloidectomy do not experience relief. To find the utility of the lidocaine infiltration test to predict the results of styloidectomy in patients clinically diagnosed as having stylalgia. Twenty-six patients undergoing styloidectomy for Eagle's syndrome were included in the study. They were divided into two groups depending on their response to lidocaine infiltration in the tonsillar fossa. Patients were followed up till 3 months after styloidectomy and their pre operative visual analogue scale for pain was compared with the post operative VAS score. Majority of the patients were females and in the fifth decade of life. There were 18 patients in group I and eight patients in Group II. The groups were similar in terms of age and sex distribution and pre operative VAS score for pain. There was good corelation between post infiltration and post operative VAS scores. The test had 94.44 % sensitivity and 87.5 % specificity. The age and sex distribution and the failure rates in the present study were similar to that reported in other studies. There are many other reasons besides elongation which can cause the typical pain of stylalgia and some of them are not amenable to styloidectomy. The lidocaine infiltration test is an useful test to predict the results of styloidectomy for Eagle's syndrome.

A. A. Singhania · N. V. Chauhan · A. George (✉) · K. Rathwala
Department of ENT, Smt. B. K. Shah Medical Institute and Research Centre, Sumandeep Vidyapeeth Campus, Piparia, Waghodia, Vadodara 391760, Gujarat, India
e-mail: doc_ajay@yahoo.com

Keywords Eagle's syndrome · Stylalgia · Lidocaine · Styloidectomy · Visual analogue scale

Introduction

Eagle's syndrome or stylalgia is characterised by chiefly throat pain among other symptoms due to an elongated styloid process. Out of the many modes of treatment, surgical shortening or excision of the styloid process by intra oral or external route is the accepted mode of treatment. However failure rates in the range of 20–30 % have been reported either immediately or in the long run [1, 2].

There are many mechanism by which an elongated styloid process causes throat pain all of which are not amenable for cure by surgical shortening of the styloid process. In this study we have used the lidocaine infiltration test to predict the results of surgery for styalgia.

Aim

To find the utility of the lidocaine infiltration test to predict the results of styloidectomy in patients clinically diagnosed as having stylalgia.

Materials and Method

The study was approved by the institutional ethics committee. All patients undergoing styloidectomy in our institute in the 2 year period April 2010 to March 2012, and who were available for a follow up period of at least 3 months post operatively were included in the study. The diagnosis of Eagle's syndrome was made on the basis of a

history of chief complaint of dull aching type of throat pain radiating along the side of throat together with a palpable styloid process in the tonsillar fossa. To record the intensity of pain felt by the patient objectively, a visual analogue scale (VAS) was devised. The VAS is a tool which is widely used to assess and compare pain objectively. It has been proven to correlate well with levels of pain felt by the patient. The patient was asked to point out the level of pain felt on a 100 mm long scale ranging from 0—which meant no pain to 10—which meant severe unbearable pain [3]. The VAS was further refined by colour coding it starting with light blue colour at the no pain (0) end, merging and ending to bright red colour at the severe pain (10) end. An image of the VAS used in the study is given in Fig. 1. The elongated styloid process was also demonstrated by taking a radiograph Towne's view with open mouth.

After arriving at the diagnosis of Eagle's syndrome the patients were administered the lidocaine infiltration test. In this test 3 cc of 2 % lidocaine was infiltrated into the tonsillar fossa on the side where the patient had complaint of pain and where the styloid process was palpable. After 15 min the patient was asked to point out the intensity of pain felt on the VAS. The change in intensity was recorded. Reduction in intensity to less than one-third of the original pain levels after injection was taken as relief.

All the cases were operated for styloidectomy by intra oral route. Patients who had a negative lidocaine infiltration test were taken up for surgery after counselling for the possibility of no relief from their pain after the surgery. Patients were discharged on the second post operative day with routine advice of a week of antibiotics, analgesics and gargles. Patients were examined again after 1 week of surgery for any developing complications in the operative bed. If the follow up was uneventful the patients were examined fortnightly until the completion of 3 months. At each follow up the patients were assessed for the relief of their symptoms, mainly relief from pain using the VAS. The VAS reading at the 3 month follow up was taken as final. Reduction in intensity by more than one-third of the pre operative level was taken as cure.

The results were collected, tabulated and analysed. The lidocaine infiltration test was statistically assessed for sensitivity, specificity, positive predictive value and negative predictive value.

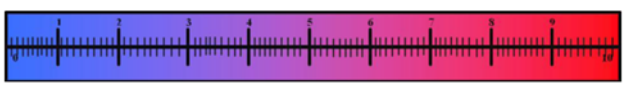

Fig. 1 Figure showing VAS used for the study

Results

A total of 36 patients undergoing styloidectomy in our institute were included in the study. However ten of these cases did not finish the required follow up period of 3 months and hence were removed from the study. Thus results from 26 cases only were taken up for the final analysis.

Majority of the cases were female (16/26). Most of the patients (14 cases, 53.85 %) were from the fifth decade of life. The youngest patient was 22 years old and the oldest was 68 years old. Five patients were in the 30 to 40 years age group and there were four patients in the sixth decade of life.

Based on the results of the lidocaine infiltration test the patients were segregated into two groups: Group I—those experiencing relief after the infiltration and Group II—those not reporting more than one-third reduction in the intensity of pain on the VAS after infiltration. There were 18 cases in Group I and eight cases in Group II. The comparative demographics and other details between the two groups were as shown in Table 1. The *t* test was applied to verify the similarity between both the groups. As can be seen from the table, the proportion of females was almost similar in both the groups. The age distribution of patients in both the groups was also similar. Mean pre operative severity of pain as assessed by the VAS was 41.48 ± 8.83 mm in Group I. This was comparable to the 49.63 ± 9.88 mm intensity of pain in Group II ($p > 0.1$).

There was a mean 8.04 mm reduction in pain after infiltration with lidocaine in patients of Group I. But in Group II there was only mean 1.68 mm reduction in intensity of pain after lidocaine infiltration. This was reflected in the post operative VAS scores too. The mean post operative pain VAS score was 0.48 ± 0.18 mm in Group I patients and 6.99 ± 5.99 mm in Group II patients. There was a good correlation in VAS scores after infiltration and post operatively. On applying the t test for

Table 1 Comparison of demographics between Groups I and II

Details	Group I	Group II	*p*
n	18	8	
Female:Male ratio	61.11 %	62.50 %	>0.05
Mean age ±SD	41.28 ± 8.83	49.63 ± 9.88	>0.1
Mean presentation VAS score ±SD	8.82 ± 0.59	9.31 ± 0.56	>0.1
Mean post infiltration VAS score ±SD	0.78 ± 0.47	7.63 ± 2.66	
Mean postoperative VAS score ±SD	0.48 ± 0.18	6.99 ± 5.99	
No. of patients relieved after surgery	17	1	

comparison of VAS scores post infiltration and post operative the values arrived at were well less than the significant level of $p > 0.05$ in both groups.

There was one case of failure of surgery in Group I and seven cases of failure in Group II. Thus the lidocaine sensitivity test had a sensitivity of 94.44 % and a specificity of 87.5 % with a positive predictive value of 94.44 %.

Discussion

The styloid process is a part of the temporal bone. It is an elongated conical projection which lies lateral to the tonsillar fossa [4]. Eagle who had first described this syndrome had reported the normal length of the styloid process to be 2.5 and had further reported that 4 % of the population had an elongated styloid process [5]. There are numerous studies using different methods reporting the length of the normal styloid and the incidence of elongated styloid process. All of them report the normal length to be in the range of 2–3 cm and a wide range in the incidence of styloid elongation [6, 7]. There are many theories for the variable growth and calcification of the styloid process like those proposed by Steinamnn [8].

In the present study majority of the patients were female. This female preponderance among patients with stylalgia has been noted by other authors too. Most of the patients in the study were in the 50–60 years age group. A similar age incidence has been reported in other studies too [1, 9].

The total failure rate in the study was 30.77 %. This more or less compares with the 22 % failure rate in a series of 18 cases previously done in our institute [10]. Other authors like Yadav SP et al. [2] have also reported failure rates in the same range. What is noteworthy here is the very high failure rate of 87.5 % among patients who had not responded to the lidocaine infiltration test (Group II). Among patients who had got significant relief after lidocaine infiltration (Group I) the failure rate was only 5.56 %.

There are many different mechanisms by which an elongated styloid process causes the spectrum of symptoms of stylalgia especially the pain. The main and the most widely recognised mechanism is compression of nerves, mainly the glossopharyngeal nerve and sometimes the lower branches of the trigeminal nerve and chorda tympani nerves too. Other factors like fracture of the ossified stylohyoid ligament, impingement on the carotid artery and its sympathetic plexus, insertion tendinosis, pharyngeal mucosal irritation, post tonsillectomy fibrotic entrapment neuropathy of neighbouring cranial nerves have also been reported to be the causative factor of pain associated with an elongated styloid process [1, 11]. Other reports like rheumatic styloiditis degenerative cervical discopathy also can be indirectly responsible for styloid related pain [1, 12]. These factors in isolation or together are responsible for the final clinical picture of Eagle's syndrome and all of them are not amenable to the surgical shortening of the styloid process. Besides this there are other conditions like upper aerodigestive tract malignancy, neuralgia and temporomandibular joint dysfunction can mimic the pain of stylalgia very closely.

Certain reasons have been forwarded for failure of styloidectomy to relieve the pain of stylalgia like intraoperative injury, subsequent fibrosis and resultant entrapment neuropathy or inadequate shortening of the styloid process [13]. But the failure could also be a result of persistence of etiological factors like inflammation and fibrotic entrapment neuropathy. More sinisterly the pain could be due to an altogether different etiology but the diagnosis could be confounded due to radiological finding of an elongated styloid process. Such patients whose symptoms are solely due to the deleterious effects of the elongated styloid process and who can be relieved by its surgical shortening can be identified by their response to lidocaine infiltration. This is proven by the good correlation between the post infiltration and post surgical VAS scores ($p > 0.1$).

Conclusion

There are more than one mechanism in play which causes the signs and symptoms related to an elongated styloid process. Sometimes this cocktail of pathogenic mechanisms may manifest in the same patient. Hence it is very important to examine the patients of stylalgia thoroughly before posting them for styloidectomy. Wrong choice of patients can lead to failure of surgery with persistence of pain and other symptoms. The lidocaine infiltration test can be used as a reliable guide to identify the patients who can get maximum relief of symptoms by surgery.

References

1. Ceylan A, Köybaşioğlu A, Çelenk F, Yilmaz O, Uslu S (2008) Surgical treatment of elongated styloid process: experience of 61 cases. Skull Base 18(5):289–295
2. Yadav SP, Chanda R, Gera A, Yadav RK (2001) Stylalgia: an Indian perspective. J Otolaryngol 30(5):304–306
3. Bijur PE, Silver W, Gallagher EJ (2001) Reliability of the visual analog scale for measurement of acute pain. Acad Emerg Med 8(12):1153–1157
4. Mortellaro C, Biancucci P, Picciolo G, Vercellino V (2002) Eagle's syndrome: importance of a corrected diagnosis and adequate surgical treatment. J Craniofac Surg 13:755–775
5. Eagle W (1948) Elongated styloid process: further observations and new syndrome. Arch Otolaryngol 47:630–640

6. Palesy P, Murray GM, De Boever J, Klineberg I (2000) The involvement of the styloid process in head and neck pain—a preliminary study. J Oral Rehabil 27:275–287
7. Zaki HS, Greco CM, Rudy TE, Kubinski JA (1996) Elongated styloid process in a temporomandibular disorder sample: prevalence and treatment outcome. J Prosthet Dent 75:399–405
8. Balasubramanium T. Eagle's syndrome. Otolaryngology. http://www.drtbalu.com/eagles.html. Accessed 25 Nov 2012
9. Naik MS, Naik SS (2011) Tonsillo-styloidectomy for Eagle's syndrome: a review of 15 cases in KVG Medical College Sullia. Oman Med J 26(2):122–126
10. Singhania AA, Bansal CR, Soni S, Chauhan NV, George A (2012) Oral approach for styloidectomy in Eagle's syndrome. Gujarat J Otorhinolaryngol Head Neck Surg 9(1):23–24
11. Balbuena L Jr (1997) Hayes D, Ramirez S G, Johnson R. Eagle's syndrome (elongated styloid process). South Med J 90:331–334
12. Strauss M, Zohar Y, Laurian N (1985) Elongated styloid process syndrome: intraoral versus external approach for styloid surgery. Laryngoscope 95:976–979
13. Ghosh LM, Dubey SP (1999) The syndrome of elongated styloid process. Auris Nasus Larynx 26:169–175