

A comparison between middle and inferior meatal antrostomy in the treatment of chronic maxillary sinus infection

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SUMMARY

Intranasal antrostomy has been performed in a series of 38 adult patients with either bilateral chronic or recurrent acute maxillary sinusitis which had failed to respond to medical treatment. In each patient, the antrostomy opening was made in the middle meatus of one side and in the inferior meatus of the opposite nasal cavity, laterality being randomised. A points' system was employed for comparing the pre- and post-operative symptoms, clinical and roentgenological findings. Symptoms and clinical findings were significantly improved following both types of antrostomy, while the roentgenological findings were essentially unchanged. Comparison of middle and inferior meatal antrostomies revealed no significant difference.

Medical treatment of acute maxillary sinusitis has a high success rate, although the therapeutic outcome has been shown to be little influenced by choice of antibiotic (von Sydow et al., 1982). Indeed, a spontaneous cure-rate of 79% has been reported in patients treated with analgetics alone (Mann et al., 1981). However, treatment failure does occur, with the development of chronic, or recurrent acute maxillary sinusitis. In these circumstances, surgery is an acceptable alternative for control of maxillary sinus infection.

The surgical procedures which have been most widely employed are the radical antrostomy of Caldwell (1893) and Luc (1897), and the intranasal antrostomy, with creation of a window in the inferior meatus (Mikulicz, 1886; Hempstead, 1927). An alternative technique is the creation of an antrostomy in the middle meatus (Siebenmann, 1912; Wilkerson, 1949; Lavelle and Harrison, 1971), the theoretical basis for this method being the observation that mucociliary transport always leads to the ostium (King, 1935; Hilding, 1944), while an antrostomy in the inferior meatus cannot passively drain the maxillary sinus since the floor of the latter is at a lower level (Macbeth, 1968).

Although inferior meatal antrostomy has been reported to give satisfactory clini-

cal results (Tarkkanen et al., 1969; Nickol, 1975; Mann and Beck, 1978; Sogg, 1982), several comparative studies performed, however, in the preantibiotic era, have indicated the superiority of the Caldwell-Luc operation (Benjamins and Huizinga, 1931; Salinger, 1939). In the present report, the results obtained following antrostomy in the inferior and middle meatus are compared.

MATERIAL AND METHODS

Intranasal antrostomy has been performed in a series of 38 patients admitted to the department in the period 1977 to 1980 with either bilateral chronic or recurrent acute maxillary sinusitis. No patient was younger than twenty years of age, and medical treatment with antibiotics and decongestives supplemented by antral wash-outs had been attempted on several occasions prior to surgery. Symptoms and clinical and roentgenological findings were systematically recorded both before and after surgery, the observation period being from two to five years. A point-scale adapted from that of Axelsson et al. (1970) was employed for quantification of symptoms and signs, and statistical significance was assessed with Student's t-test. In each patient antrostomy was performed in the inferior meatus on one side and in the middle meatus of the opposite nasal cavity according to standard techniques, laterality being randomised.

RESULTS

The total points scores for the 38 patients are presented in Table 1, and show no bias in the randomisation. There was a significant improvement in symptoms ($p < 0.001$) and clinical findings ($p < 0.01$) for both types of antrostomy, while there was no significant difference ($p > 0.2$) between the surgical techniques. None of the roentgenological comparisons attained statistical significance ($p > 0.2$).

Table 1. Total points scores and significance values for symptoms and clinical and radiological findings before and after antrostomy in the middle and inferior meatus.

	preoperative		post-operative ($p > 0.2$)
<i>symptoms</i>			
middle meatus	223	$p < 0.001$	76
inferior meatus	220	$p < 0.001$	73
<i>clinical findings</i>			
middle meatus	101	$p < 0.01$	46
inferior meatus	102	$p < 0.01$	38
<i>radiological findings</i>			
middle meatus	64	$p > 0.2$	62
inferior meatus	59	$p > 0.2$	53

DISCUSSION

Our interest in the middle meatal antrostomy was aroused by considerations of sinus physiology and anatomy, and by the clinical experience with several patients, operated elsewhere, who had severe neuralgic sinus pain, particularly on exposure to wind and cold, following creation of a large window in the inferior meatus.

Already in 1767 Jourdain described surgical drainage of the maxillary antrum through the middle meatus. This report did not, however, gain the recognition it deserved, and the influence of Mikulicz (1886) led to wide acceptance of the inferior meatal antrostomy, which was subsequently included in the Caldwell-Luc operation. The membranous nature of much of the lateral nasal wall in the middle meatus facilitates creation of a window, and influenced Siebenmann to adopt this approach to the maxillary sinus in 1912. There have, subsequently, been few reports of the middle meatal antrostomy, although both Wilkerson (1949) and Lavelle and Harrison (1971) maintained, without comparative documentation, that the results obtained with this approach were superior to the more traditional inferior meatal operation. A literature search has failed to reveal any other study in which these operations have been compared, although Krajina in a published discussion (Legler, 1981), stated there was no difference in the final results following antrostomy in either the middle or inferior meatus.

The similarly negative results of the present investigation may either reflect absence of a real clinical difference between the two operative techniques, or be the result of statistical uncertainties unavoidably associated with small samples. The latter is a natural consequence of the generally successful medical treatment of acute maxillary sinusitis (Eichel, 1977; von Sydow et al., 1982), and the consequently small number of patients with bilaterally symmetrical sinus disease requiring surgery for alleviation of symptoms.

Middle meatal antrostomy is a minor surgical procedure with a minimum of possible complications, the most important being avoided by creation of the window low in the meatal wall to avoid possible entry to the orbit. Long-term symptomatic complications have not been seen and, in particular, no patients have complained of post-operative neuralgia. The window remains patent (Kubo, 1912), and the need for further surgery has been confined in the present series to patients who have developed nasal polyposis. The middle meatal antrostomy is a more physiological operation, and is a valuable supplement to the medical treatment of chronic or recurrent acute maxillary sinusitis. Routine roentgenological control after antrostomy is not necessary.

ZUSAMMENFASSUNG

In einer Untersuchungsreihe von 38 erwachsenen Patienten ist eine intranasale Antrostomie durchgeführt worden, entweder auf Grund bilateral chronischen oder rezidivierenden acuten Maxillarsinusitis, die nicht auf einen medikamentellen Therapie angesprochen hatten. Nach Randomisierung wurde jeder Patient, auf der einen Seite durch den mittleren, auf der anderen Seite durch den unteren Nasengang, bilateral operiert.

Nach einem Punktesystem wurden prae- und postoperative Symptome, sowohl als auch klinische und röntgenologische Befunde verglichen. Symptome und klinische Befunde waren signifikant verbessert nach der Operation, jedoch ohne Seitenunterschied, während die Röntgenbefunde keine wesentlichen Unterschiede ergaben.

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