

Diagnosis and treatment of sinusitis by YAMIK sinus catheters*

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SUMMARY

We describe a new type of device capable of creating a controlled pressure in the nasal cavity and paranasal sinuses, thus enabling evacuation of pathological contents and introduction of diagnostic or therapeutical substances.

Key words: sinusitis, diagnostics, treatment, sinus catheter, negative pressure

INTRODUCTION

At present, treatment of sinusitis by applying negative pressure in the nasal cavity is not a commonly used method. The reason is that it is impossible to create negative pressure in the nasal cavity by conventional means. The idea of treating sinusitis by negative pressure was first described by Sondermann (1905) and further developed by Gellat (1911) and Proetz (1926). Although a very fetching model, it was not further developed. In 1980, we started to design a device to create controlled pressure in the nasal cavity and paranasal sinuses. The device has been given the name YAMIK sinus catheter - the acronym YAMIK is derived from Yaroslavl, Markov and Kozlov.

PRINCIPLE OF THE YAMIK SINUS CATHETERS

YAMIK sinus catheters represent a new type of device capable of creating a controlled pressure in the nasal cavity and paranasal sinuses, thus enabling evacuation of pathological contents and introduction of a diagnostic or medical substance. In the present paper we will discuss the YAMIK-3 sinus catheter (Figure 1).

The YAMIK-3 sinus catheter is made from natural latex (Revultex™). It consists of a body (1) with two inflatable balloons (2+3) and two valves (7), one on either side. In the body, a flexible rod (8) allows shaping of the body to the anatomy of the nasal cavity. The second inflatable balloon (3) is mobile in respect to the body and contains a rigid tube with a working passage (6) with an adapter for a syringe (5).

The principle of the YAMIK sinus catheter is as follows:

1. The patient sits with his head inclined to the contralateral side of the affected diseased sinus.

2. Topical anaesthesia and decongestion are carried out by means of lidocaine and adrenalin.
3. The body of the sinus catheter is then positioned according to the anatomy of the nasal cavity. Balloons 2 and 3 are placed at such a distance from each other as to allow sealing of the choanae and the vestibule by inflation.
4. About 10-12 ml of air is introduced into balloon 2 to close off the choana, some 5-7 ml is inflated to obturate the vestibule.

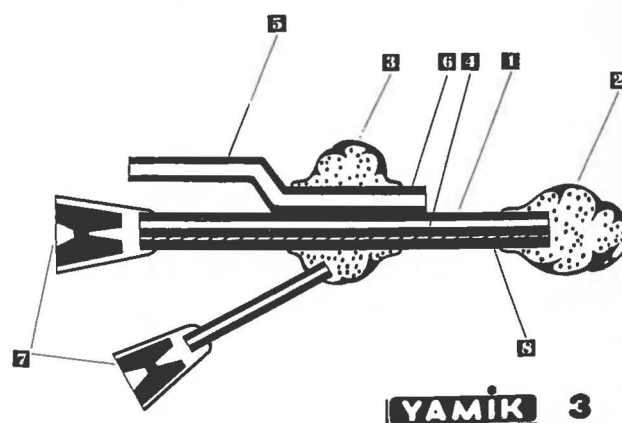


Figure 1. The YAMIK-3 sinus catheter. For explanation of numbers refer to text.

5. A syringe is now attached to the working canal and, gradually, negative pressure is created in the nasal cavity. As a result pathological secretions will be aspirated from the paranasal sinuses. To facilitate cleansing of the sinus, the pressure may be changed from negative to positive, back

and forth. The patient will have the feeling of "pulling out" in the sinuses, but is not feeling any pain. Quite frequently, headaches disappear or decrease during the procedure.

6. After evacuation of secretions the patient is positioned on his/her side with the head hanging down so that the ostia of the paranasal sinuses are facing down.
7. Depending on the purpose (diagnostic or therapeutic) either a radiopaque solution or medication is injected.
8. Approximately 1 ml is introduced and immediately the piston of the syringe is pulled backwards, creating a vacuum in the nasal cavity which aspirates air from the paranasal sinuses and allows the solution to penetrate into the sinus. Successive instillation of small amounts into the nasal cavity followed by introduction of a vacuum allows the substitution of the air in the sinuses by the solution.
9. The procedure is stopped when no more air can be aspirated. The YAMIK sinus catheter is then removed.

CLINICAL EXPERIENCE

Diagnostics

The YAMIK sinus catheter is used to examine the patency of the natural ostium as well as the condition of the sinus mucosa. Eighty patients (52 men and 28 women; aged 17–52 years) have been examined. The examination is done with an X-ray set-up, and Urografin was used as a contrast fluid. Figures 2–3 show radiograms of the paranasal sinuses obtained in this way. Apart from a round cyst at the antral base, the whole sinus is filled by the contrast medium. There is also a notable swelling of the mucosa of the ethmoidal cells. The method provides information about the pathological condition of the sinuses as well as about the patency of the ostia. Unlike CT-scan, the data do not give information about the interrelationship with the nasal structures, but they do allow visualisation of the interrelationships of the sinuses themselves. An advantage of this diagnostic method is that it can be performed on an out-patient basis within 10–15 min.

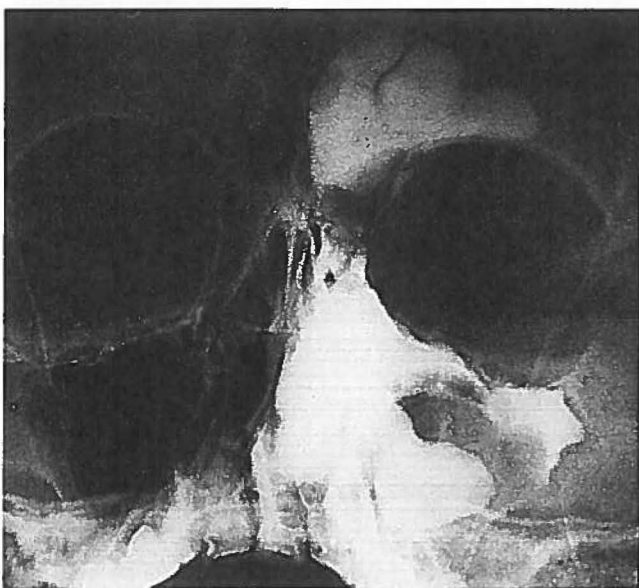


Figure 2. Frontal X-ray view of paranasal sinuses after contrast injection.



Figure 3. Lateral X-ray view. Apart from a round cyst at the antral base, the whole sinus is filled by the contrast medium. There is also a notable swelling of the mucosa of the ethmoidal cells.

Treatment

Until now, the method has been used as a treatment in many hundreds of patients with sinusitis of all ages from five years on. An antibiotic (such as cephalosporin) or antiseptic (such as furacillin) solution is introduced in the way described above. The treatment is given daily or every other day depending on the symptoms during a period of one week, and combined with systemic antibiotics for seven days and decongestant nosedrops. Complete healing has been obtained in 88.5%, and improvement in 10%.

CONCLUSION

The YAMIK sinus catheter is of great help in diagnosing and treating sinusitis, especially in the out-patient department. It is a quick and effective method to measure the function of the ostium, to examine the condition of the antral mucosa and to treat sinusitis.

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