



How To Perform Nasogastric Aspiration in Children

Çocuklarda Mide Açlık Sıvısı Örneği Alımı

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Introduction and General Information

Tuberculosis (TB) infection still exists as deadly infectious disease worldwide. According to the Ministry of Health TB guide 2019 data, approximately 11.800 patients were diagnosed in our country in 2018 (1). Epidemiological data are limited due to difficulties in diagnosing TB in the pediatric age group. It is estimated that there are 1 million new cases of TB in pediatric annually worldwide, but the vast majority of these are undiagnosed. If diagnosed and effective treatment is initiated, mortality of pediatric TB disease is very low (2).

Getting sputum is difficult in pediatric age group because children cannot make effective expectoration and they swallow sputum containing *M. tuberculosis* bacilli. Therefore, fasting gastric fluid, induced sputum, nasopharyngeal aspirate or bronchoalveolar lavage sampling methods are used to insulate bacilli in children.

Fasting gastric fluid sampling is a method used to microbiologically confirm the diagnosis of tuberculosis by collecting stomach contents. A sample of fasting stomach fluid should be performed in centers where both culture and microscopic examination are possible due to both stress caused by the child and low chance of catching bacilli on direct microscopic examination (3). Only microscopic examining could give positive result in less than 10% of phenomenon and false positive results are also common due to the presence of non-tuberculosis mycobacteria (4).

Producing bacilli in culture for TB diagnose is gold standard method for diagnose. The culture is important in directing treatment because it shows the sensitivity or resistance of bacillus to the antibiotics used in treatment. Sample taken to determine reproduction in liquid or solid culture media should contain at least 10-100 colony forming units bacilli per milliliter (5). Chance of reproducing bacilli in gastric aspirates taken three successive times in the childhood age group is 30-40 percent (4). However this rate is higher in infants or children living in endemic areas for TB (6). For his reason, the absence of bacilli in microscopic examination or the absence of reproduction in culture does not rule out the diagnosis of TB.

Fasting gastric fluid sampling is especially applied to children with suspected pulmonary TB and who cannot give sputum sample. During sleep, mucociliary structure in lungs push the sputum into the throat. The child swallow the sputum when he wakes up and the sputum remains in the stomach until the gastric emptying period. For this reason, it is very critical to make gastric aspiration in the early morning with empty stomach. The highest yield is obtained in cultures made from gastric fluid sample taken with empty stomach in the morning.

Fasting gastric fluid aspiration is applied in morning of two or three successive days and then the chance of catching positiveness increase. A process requires two people, one of

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whom applies the process, and one of whom helps. Before the process, it is important that infants are hungry for at least three hours and older children for at least four hours. Water, medicine or breast milk should not be given during fasting.

Requiring material for process (Figure 1)

- √ N95 mask
- √ Gloves
- √ Sheet to immobilize child
- √ 8-10 French and larger nasogastric (NG) tube
- √ Syringes in 5, 10, 20 and 30 ml capacity and connector suitable for NG tube
- √ Sample jar
- √ Pen/marker
- √ Laboratory request forms
- √ Sterile water or normal saline (0.9% NaCl)
- √ Sodium bicarbonate (8%)
- √ Alcohol-based disinfectant

Before Process

First of all, family is informed about process and written consent form is explained physician and signed by family. It should be explain to family that process will take short time but children will feel discomfort for short time. The family should be encouraged to wait outside during the process. Parents' empathy with the child may cause them to interfere with the process. The information should be given that the child will be given to the family as soon as the procedure is completed.

The door of room to be processed should be close and it should be kept closed for a hour.

At least two people are required for the procedure.

If the child's thrombocyte count is low or there is active bleeding, the process of taking fasting gastric fluid should be postponed.

Process

Step 1

The child is immobilized with help of sheet. The distance from the nose to the stomach is measured with an NG tube.



Figure 1. Materials to be used during the process.



Figure 2. Measuring the distance from the nose to the stomach with nasogastric tube.

NG tube is held flexibly starting from the tip of the nose and pulled up to the ear. The distance measured by holding it flexibly from the ear level to the lower end of the xiphoid protrusion is marked on the tube. This distance demonstrates that how much of tube should be inside (Figure 2).

Step 2

The tip of NG tube is moisturized in child's mouth. Lubricants are not used for this process due to their bacteriostatic effect. NG tube is placed in child's nose and gently advanced toward throat. While moving the tube, the nasal septum is avoided and it is pushed the NG tube perpendicular to the bed. Check of in-mouth is proposed in order to make sure that the tube is not interlaced in mouth. When the child begins to swallow, the tube is quickly pushed to the previously measured distance. Rarely, NG tube may advance toward airway. In this case, the child will have respiratory distress and hoarse crying. In this situation the tube should pull back. If the process of placing the tube into the stomach is successful, there will be a strong and constant cry, the stomach contents inside

the tube can be seen, and a rumbling sound is heard on the auscultation on the stomach when air is given by the injector.

Step 3

After making sure that the tube is in stomach, stomach contents are aspirated. It is ideal to obtain at least 5-10 ml content. The contents obtained are transferred to a sterile sample container. Sodium bicarbonate (8%) is added to this up to the volume of stomach contents. The aim of this process is to prevent fragmentation of TB bacilli in an acid media.

Step 4

If the desired amount of content is not obtained, the tube is moved slowly. At that time, the aspiration is continued gently. The sample is still insufficient, the second staff gently moves the child right and left. If the sample is not sufficient despite these, after making sure that the tube is in the stomach, 20 ml of sterile water is given through the tube, after waiting a few seconds, it is aspirated again.

Step 5

If sufficient sample is obtained, NG tube is pulled immediately, the child is given to family and fed.

After Process

Make sure that the lids of sample jars are tightly closed. To prevent cross-infection, jars are wiped with alcohol-based disinfectant and then, labelling process is done.

Laboratory request forms are filled properly.

Samples are sent to the laboratory as soon as possible in accordance with the cold chain. If the sample cannot be sent to the laboratory immediately, it can be stored in a refrigerator at 4-8°C for up to 4 hours.

The treatment room is cleaned and ventilated, no one is allowed in the room for 1 hour.

Discussion

Diagnosis of TB in children is possible by evaluating all the evidence obtained from history, clinical examination and related studies (3). A careful exposure history, clinical findings, radiological findings, immunological and molecular-based tests should be evaluated together for diagnosis and samples for bacteriological confirmation should be obtained from any child with clinical suspicion. Tuberculin skin test (TDT) based immunological and interferon gamma release tests measure immune response of the body against bacillus, but fail to distinguish between latent TB and active disease, also, it cannot provide sufficient information in immunocompromised children (7).

In recent years, methods such as Xpert MTB/RIF, urine anti-gene test, "string test", "lung flute" for TB diagnosis have come to fore but although all advances in diagnosis, gold standard is still to reproduction of bacilli in culture. For this reason, taking fasting gastric fluid in pediatric cases with suspected pulmonary TB and who cannot give sputum sample is still up-to-date.

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