PRE – PREANALYTICAL CONCERNS ON THE MONOSED-SR FOR THE NEW MICROSED - SR ERYTHROCYTE SEDIMENTATION RATE ANALYZER

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ABSTRACT

The erythrocyte sedimentation rate (ESR) is a time-honored blood test, useful in laboratory medicine. There are several new techniques developed for determination ESR at present. Automated ESR analyzer have been launched for a few years and approved for the laboratory diagnostic property. Here, the authors reported the mechanical consideration and pre-analytical user response to the new Automated ESR analyzer. All of the phlebotomist (8 phlebotomists) noted that this new vacuum tube is not comfortable for usage due to two reasons; a) the length of the tube exceeds the fully extension span between thumb and index fingers and b) the diameter of the tube is too small comparing to the standard needle holder. They said that these two reasons bring the delay in the venipuncture process for 1 – 2 minutes/ cases. The tube length of MonoSed-SR is 2 times about greater than the length of the needle holder and the diameter of MonoSed-SR is about a half of that of the needle holder. These facts make the users felt uncomfortable to use the tube. In addition, mechanical fulcrum can be expected and can bring the failure of venipuncture.

Key words: Erythrocyte sedimentation rate, concern

INTRODUCTION

The erythrocyte sedimentation rate (ESR) is a time-honored blood test, which assesses the degree of erythrocyte aggregation by acute phase proteins such as fibrinogen and immunoglobulins1. The ESR still is a very valid test for the diagnosis of certain chronic diseases (polymyalgia, rheumatoid arthritis, multiple myeloma, septic arthritis and osteomyelitis) and the follow-up of certain chronic diseases (polymyalgia rheumatica, systemic lupus erythematoses, chronic infections, prostatic cancer, and Hodgkin's disease)1. It is simple, inexpensive test, but unfortunately it lacks sensitivity and specificity2. Clinicians need to be aware of appropriate uses, because any test is expensive when ordered often, and evaluation of false-positive results may incur substantial costs and place the patient at risk from additional procedures2. There are several new techniques developed for determination ESR at present3. Automated ESR analyzer have been launched for a few years and approved for the
laboratory diagnostic property⁴. However, the real usage of the system must concern the whole process starting from the pre-analytical phase. Here, the authors reported the mechanical consideration and pre-preanalytical user response to the new Automated ESR analyzer.

**MATERIALS AND METHODS**

A. Automated ESR analyzer

A new erythrocyte sedimentation determination (ESR) method, MicroSed SR-system (ELECTA-LAB), was evaluated for its appropriateness in real usage in the clinical laboratory. This system is the new analyzer based on the piezoelectrical principle. The sedimentation rate can read within 30 minutes. The system has to be used with a specific vacuum tube, MonoSed –SR containing 0.13 % sodium citrate. This tube will be further considered in the evaluation of pre-analytical phase.

B. Consideration for the pre-analytical phase

Mechanical consideration is the main focus. The size of specific vacuum tube for the MicroSed SR-system is compared to that of the standard vacuum tube as well as the needle holder.

C. User response

The response of the pre-analytical users or phlebotomists at the venipuncture clinic after 1-month trial was summarized.

**RESULTS**

A. Mechanical consideration

The size of MonoSed –SR, classical ESR vacuum tube and standard needle holder are shown in Table 1.

Table 1. Mechanical consideration of MonoSed –SR, classical ESR vacuum tube and standard needle holder.

<table>
<thead>
<tr>
<th>equipment</th>
<th>Diameter (cm)</th>
<th>Length (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MonoSed-SR</td>
<td>1.0</td>
<td>12.5</td>
</tr>
<tr>
<td>Classical ESR vacuum tube</td>
<td>1.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Needle holder</td>
<td>2</td>
<td>5.5</td>
</tr>
</tbody>
</table>

* Average fully extension span between thumb and index fingers of general population is about 11 – 13 cm.
B. User response

The trial of the MonoSed–SR was set at venipuncture clinic (the name of the setting is blinded due to privacy reason). The response of the pre-analytical users or phlebotomists at the venipuncture clinic after 1-month trial was summarized. All of the phlebotomist (8 phlebotomists) noted that this new vacuum tube is not comfortable for usage due to two reasons; a) the length of the tube exceeds the fully extension span between thumb and index fingers and b) the diameter of the tube is too small comparing to the standard needle holder. They said that these two reasons bring the delay in the venipuncture process for 1–2 minutes/cases.

DISCUSSION

Erythrocyte sedimentation rate is a non-specific parameter used for the differential diagnosis and follow-up the patients\(^1\)–\(^5\). In the present day there are many methods to determine the erythrocyte sedimentation rate. All methods have the same principle - sedimentation principle\(^5\). The standard method is Classical Westergren method\(^3\). There are equipment developed in order to increase safety and reduce time required for the procedure\(^3\).

In order to accept a new technique to the medical laboratory, a careful assessment is needed. The assessment process should focus not only analysis phase but also other phase of laboratory quality cycle. According to this work, the authors assess the pre-analytical phase acceptability of the new automated ESR analyzer. The author focused the interest on the new vacuum tube, MonoSed-SR. Here, it can be shown that the user perception to the new vacuum tube is not as good as the previous classical ESR tube. Indeed, Wiwanitkit recently indicated that the synchronized equipment and sharp needle are the two major requirements of the practitioners\(^5\). In this study, all phlebotomist experience the difficulty in using of the new tube due to the inappropriate length.

Mechanically, the MonoSed-SR is longer than the classical tube for 4 cm and it reach the fully extension span between thumb and index fingers of general population which can make the user difficulty in one hand management of the vacuum tube in the venipuncture process, especially for the step of tube insertion into the needle holder and mixing up of the blood specimen inside the tube. In addition, the tube length of MonoSed-SR is about 2 times greater than the length of the needle holder and the diameter of MonoSed-SR is about a half of that of the needle holder. These facts make the Mono-Sed-SR tube lies unstably within the holder and make the phlebotomist hard to fix. Mechanical fulcrum can be expected and this can lead the tube accidentally pushed outside the needle holder during venipuncture before proper amount of specimen is derived and make that venipuncture fail. These situations are also notified by the phlebotomist in this study.

COMPETING INTERESTS

The author declares no competing interest.
REFERENCES