Comparison of Diamond's Medium Modified and Kupferberg Medium for Detection of Trichomonas vaginalis

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Diamond's medium modified, the commercially available version of the Klaas modification of Diamond's medium, was compared to Kupferberg medium and to direct wet-mount examination for detection of trichomonads in symptomatic patients. Diamond's medium was found to be superior to both Kupferberg medium (P < 10^-4) and wet mount (P < 10^-6).

In a previous study, we have shown that culture for Trichomonas vaginalis by using Kupferberg medium is not significantly superior to thorough wet-mount examination (2). At the time of that study, Kupferberg medium was the only commercially available medium for Trichomonas culturing approved for clinical diagnostic use. Recently, Diamond's medium modified (Klaas modification [1]) received U.S. Food and Drug Administration approval for clinical diagnostic use. We wished to compare Kupferberg to Diamond's medium modified in a clinical setting to see whether the newer culture medium was significantly superior to the older medium and to wet-mount examination for detection of T. vaginalis in symptomatic patients.

Kupferberg and Diamond's medium modified are commercial products of Remel (Lenexa, Kans.). With the exception that Remel Diamond's medium modified contains 12% horse serum rather than 10%, it is the exact formulation described by Fouts and Kraus (1). Appropriate quality control of the media to verify the pH and assure that the media could support organism growth was performed. We used T. vaginalis ATCC 30001 and stock clinical isolates for this purpose. Media were stored at 2 to 8°C but brought to room temperature prior to use. Media were used as recommended by the manufacturer.

Vaginal secretions were obtained from 163 female patients of reproductive age attending the Obstetrics and Gynecology Ambulatory Area at Sinai Samaritan Medical Center who presented with vaginal discharge complaints. Specimens were collected by the study nurse on three saline-premoistened cotton-tipped swabs from the anterior fornix of the vagina of each patient. These swabs were not labeled so that when given to the technician, who subsequently placed one in each medium and used the third one for preparation of a wet mount, there would be randomization of sampling. The media were incubated at 36 ± 1°C in a Napco (National Appliance Company, Portland, Oreg.) controlled-environment incubator in 5 to 7% CO₂ at 80 to 85% humidity. Samples were taken from the bottoms of the tubes at 2, 5, and 7 days and examined under wet mount, first at 100 and then with suspicious areas viewed at x400. The tubes were not centrifuged prior to sampling. Examination was thorough, with over 100 fields per slide examined at x100. A culture was considered negative if no growth was seen after 7 days. Direct wet-mount examination of vaginal secretions was performed in a similar manner. The specimen was placed in 1.0 ml of physiological saline. The saline suspension was used for the wet mount. Only motile trichomonads were considered positive, and all positive observations were confirmed by a second observer. McNemar's chi-square statistical method was used for analysis.

Trichonomads were detected in 52 patients (32.0%) by Diamond’s medium modified, in 40 patients (24.5%) by Kupferberg medium, and in 35 patients (21.5%) by direct wet-mount examination. Four specimens detected by wet mount failed to grow in Kupferberg medium, but all specimens that were positive by wet mount or in Kupferberg medium grew in Diamond’s medium modified. Statistical comparison of data from 163 patients showed that Diamond’s medium modified was significantly superior to both Kupferberg medium and wet mount. We used McNemar’s chi-square statistics for this comparison. The chi-square value for when Diamond’s medium modified was compared with Kupferberg medium was 22, which translated to a probability of less than 10^-4. When Diamond’s medium modified was compared with the wet-mount method, the chi-square value was 27, which translated to a probability of less than 10^-6. When Kupferberg medium was compared with the wet-mount method, the chi-square value was 1.923, which translated to a probability of 0.1655. The relative efficiency was 100% for Diamond’s medium modified, 76.9% for Kupferberg medium, and 67.3% for direct wet mount. Specificity of all methods was 100%, since only viable trichomonads were counted.

Of the two commercially available culture media for trichonomads, Diamond’s medium modified proved to be superior to Kupferberg medium (P < 10^-4). As we reported earlier, there was no significant difference in relative efficiency between Kupferberg and direct wet-mount examination of vaginal secretions (P = 0.1655) (2). Diamond’s medium modified was so superior to wet mount (P < 10^-6) that it can be argued that despite the increased cost of culturing (approximately $1.50 for the medium and the cost of up to three wet-mount examinations of the medium), the vastly superior efficiency makes it cost-effective to culture when T. vaginalis is suspected.

Although in this study our relative efficiency for Diamond’s medium modified was 100%, it would not be surpris-

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ing to find strains seen on wet mount that do not grow in culture. For this reason and because of the fact that culturing can take up to 7 days, we recommend that direct wet mount still be used for primary detection.

We thank Remel for providing the Diamond’s medium modified.

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