Cost Containment of Formalin-Preserved Stool Specimens for Ova and Parasites from Outpatients

CARYN S. PETERS, LOWELLA HERNANDEZ, NORA SHEFFIELD, ANDREA L. CHITTON-SWATLIO, AND FRANK E. KOCKA*

Division of Microbiology, Cook County Hospital—Hektoen Institute for Medical Research, Chicago, Illinois 60612

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Three individual formalinized stool specimens from each of 123 patients were pooled and examined for ova and parasites. Results obtained from the pooled specimens were compared with those obtained with the three individual specimens used to make the pooled specimens. Of 123 sets examined, 92 were negative and 31 were positive for ova and parasites. The pooled specimens were positive and all individual specimens were negative eight times, whereas the pooled specimens were negative and the individual specimens were positive twice. The data indicated that the pooled system is a useful and economical method of screening for ova and parasites.

Ova and parasites are not always found in consistent numbers in daily stool specimens; therefore, multiple specimens should be examined over a period of time (2). Outpatient clinics frequently give patients multiple sets of vials with preservative for stool collection to rule out ova and parasite infection. To control rising laboratory costs in outpatient care, this report is a comparison of pooled stool specimens versus three individual specimens for ova and parasite examination.

Outpatients were given three sets of vials and instructed to place a fresh stool specimen in one set on each day for 3 consecutive days if diarrheal stool was present or on every other day for 6 days when the patient did not have diarrhea. The set of vials consisted of a 10% Formalin-containing vial and a polyvinyl alcohol (PVA)-containing vial. Each vial contained 10 ml of fluid. When the vials were returned to the laboratory, one technologist (N.S.) was assigned the task of taking a 1/3 volume sample from each Formalin-containing vial and preparing a pool. The remaining 2/3 of the three Formalin-containing vials and the pool were each concentrated by using the Formalin-ethyl acetate procedure (7). The concentrated pool and each individual concentrate were coded and given to technologists (C.P. and L.H.) to determine whether organisms were present. The technologists were unaware of the results until the project was completed.

The sediments were examined with D’Antoni iodine, and smears were made for staining with the modified acid-fast technique (3). The iodine-stained specimens were examined on low power from cover slip edge to cover slip edge. Areas suspicious for ova and parasites were examined under high power. Fifty fields of the acid-fast smears were examined under oil immersion. A pool was not made from the PVA-containing vials. Permanent smears were prepared from the PVA material stained by the Mallory iron-hematoxylin procedure (4). A smear from each individual and one from the pool were examined. At least 50 fields on each permanent smear were read under oil immersion.

Of 123 specimen sets from patient, 92 were negative (in this group, in three instances organisms were seen only on PVA-preserved, stained slides) and 31 were positive. In two cases the pooled specimens were negative, whereas one or all of the individual vials in the set of three were positive. The organisms were Strongyloides stercoralis larvae in one set and Entamoeba histolytica cysts in the other. In eight cases, the pool was positive and all of the individual vials in the sets were negative (in these last 10 cases, organisms missed in the pool or individual Formalin concentrates were seen on PVA-preserved, stained slides). Both the pool and some members of the individual sets were positive with the same organisms 21 times. As noted, not all of the individuals in the set were positive each time or for all of the organisms seen, but the totals of all of the organisms seen were the same. In all cases, when organisms were missed in the pool or the individual Formalin-containing vials, they were seen in the PVA-preserved, stained slides.

We have used this method in a previous study for collecting diarrheal specimens from patients attending an outpatient clinic (5). In this previous study there were no laboratory costs to the patients, so the laboratory had to keep its expenses to a minimum.

Only two organisms were missed in the pool. In both cases, the organism was seen in only one of the individual vials and in low numbers. Of the eight instances in which the pool was positive and all three individual vials were negative, the organisms were probably in insufficient numbers in one or multiple vials; however, they were seen in the PVA-preserved, stained slides. A wide variety of organisms were seen during the trial period, including Cryptosporidium sp. and Isospora belli, organisms more commonly seen in patients with acquired immunodeficiency syndrome (6). In addition to showing the usefulness of a pooled specimen, the study verified the need for stained slides of preserved specimens and showed that multiple sets of specimen vials were needed to rule out infection with ova or protozoa.

The major cost in a parasitology laboratory is the labor required for microscopic work on specimens. Since there is considerable variation in the charges of a parasitologic examination and labor costs among hospitals, the best way of measuring savings is through College of American Pathologists workload units (1). With the pooling method, the work saved includes two concentrations, two iodine smears, and two acid-fast smears. This can be interpreted as 38 College of American Pathologists workload units (1) or approximately 38 min. With proper instructions, patients can collect their own specimens in one container, saving the time required to pool the specimens.

* Corresponding author.
LITERATURE CITED