Q&A column

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Submit your pathology-related question for reply by appropriate medical consultants. CAP TODAY will make every effort to answer all relevant questions. However, those questions that are not of general interest may not receive a reply. For your question to be considered, you must include your name and address; this information will be omitted if your question is published in CAP TODAY.

Q. The classic literature on collection tube order for cerebrospinal fluid testing usually says tube one is for chemistry, tube two is for microbiology, tube three is for hematology, and tube four, if collected, is extra. But I have seen some sources that say cell count testing should be done from tube four. In this scenario, tube one is extra, tube two is chemistry, tube three is microbiology, and tube four is hematology. What is the current standard practice?

A. July 2019—Normal CSF is a clear, colorless fluid, produced by the choroid plexus of the ventricles, that fills the ventricles and surrounds the brain and spinal cord. It delivers nutrients, removes waste, and cushions the brain and spinal cord from acute pressure changes. CSF is a valuable fluid for diagnosing infections, malignancy, and a variety of neurological and other conditions. Collection of CSF most commonly involves inserting a needle into the intervertebral space between the L3 and L4 lumbar vertebrae and removing five to 15 milliliters of fluid. The fluid is collected into sequentially labeled sterile tubes.

Procedures vary slightly between laboratories, but there are three areas of consensus. The first point is that a minimum of three tubes should be collected. The second point is that cell counts are most accurate when performed on the last tube collected. Thus, cytopathology and flow cytometry are typically also performed on the last tube collected so these results can be correlated with the cell count data. The reasoning behind this is that the last tube collected would be the least likely to be contaminated by blood or debris from the collection process. The third point of consensus is that testing should be performed as quickly as possible to ensure that the most accurate data are collected.

Review of multiple large reference laboratories' procedures posted online and the literature showed the most common testing protocols for three collected tubes involved performing chemistry and immunological testing on tube one, cultures and PCR testing on tube two, and cell counts on tube three. If four adequate samples were collected, tube one was held in reserve (as it is the most likely to have blood or debris contamination), tube two was used for chemistry and immunological testing, tube three was used for microbiologic testing, and tube four was used for cell counts and other analyses. This implies that the samples should be evaluated for adequacy if four tubes are used to ensure that ample sample is present for the needed analysis. If the fourth tube is scanty, the laboratory may want to revert to using the first tube for chemistry and immunological testing rather than possibly compromising the data collected from the CSF collection procedure.

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3. Perkins SL, Couturier MR, Grenache DG, Kjeldsberg CR. Cerebrospinal

fluid. In: Hussong JW, Kjeldsberg CR, eds. *Kjeldsberg's Body Fluid Analysis.* Chicago: ASCP Press; 2015:45.

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In upcoming issues, we will reprint a few coagulation-related questions and answers in a "Best of Q&A" series. They date back to 2014 but all have been reviewed for their timeliness and relevance today. The following question and answer were published in March 2015.

Q. The absence of coagulation of seminal fluid has been attributed to bilateral congenital absence of the vas deferens and seminal vesicles due to the absence of the coagulation substrate (fibrinogen-like precursor). What is the significance of the absence of coagulation of seminal fluid in a patient who previously experienced normal seminal fluid coagulation, followed by normal liquefaction, and had fathered children? Are there medications that can prevent seminal fluid coagulation? Are there pathologic processes—carcinoma, for example—that can affect the prostate gland and prevent seminal fluid coagulation (possibly due to an increase in enzymes of prostatic origin such as acid phosphatase), causing a localized acceleration of the fibrinolytic process?

A. I discussed this at length with our urologic specialist and another teaching faculty physician, and they agree that the coagulation/liquefaction are often variable within multiple samples from any single patient for reasons currently unknown. While men with prostate cancer often exhibit absence of coagulation, it is not necessarily an indicator of that cancer. Anecdotally, several medications have been observed to interrupt coagulation or liquefaction—some antidepressants, antihistamines, and a few others. In the case of a patient who had previously fathered children, neither physician felt this alone was reason for concern.

In the end, the lack of coagulation is not a clinical concern to either physician in routine care. The patient should be able to produce children with assisted reproductive technology in the case of congenital bilateral absence of the vas deferens.

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