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Commentary

The Cost of Low-Osmolality Contrast Media: Can We Minimize the Economic Impact?

Richard E. Latchaw[1]

Everyone in the radiologic community is aware of the dilemma caused by the introduction of low-osmolality contrast media, a term that includes both the nonionic and the dimeric ionic compounds. These agents are more physiological and produce fewer adverse reactions than the traditional ionic agents (high-osmolality contrast media). We all would like to use the newer agents for all procedures, but the expense of doing so produces the dilemma. The low-osmolality agents are 15 to 20 times more costly than the high-osmolality agents. Consequently, universal use of the newer agents would mean a minimum of $1 billion of added medical expenditures in the United States each year [1, 2]. The country has no national reimbursement policy for these compounds nor any legislation, such as was passed in Australia, dictating the use of low-osmolality instead of high-osmolality agents. Therefore, decisions for the use of the low-osmolality agents are made by individual practitioners and medical institutions, and the monetary impact falls directly on individual radiology departments. This has forced prioritization between contrast media, X-ray film, new equipment, and a whole host of other items necessary for the daily practice of imaging.

Attempts have been made by individual institutions to decrease the economic impact by limiting the use of low-osmolality contrast media to patients who are considered high risk. Protocols with a variety of criteria have been established. The usual result is that approximately 50% of hospitalized patients in urban centers receive low-osmolality agents [3]. However, the ability to define high-risk and low-risk populations has been brought into question. The comparative study in Australia was stopped when it was shown that the low-risk group of patients receiving high-osmolality contrast media had higher rates of severe adverse reactions and death than did the higher risk patients receiving low-osmolality media. This inability to predict the reaction rate on the basis of preprocedural criteria led the Australian government to stop the study and legislate the universal use of low-osmolality contrast media. Finally, because emergency resuscitation is difficult in the outpatient setting, many radiologists practicing in private offices have opted for the safe approach of total conversion to the low-osmolality agents.

The United States has no national posture on reimbursement and legislation requiring use of low-osmolality contrast media, yet in this time of cost constraint, we wish to preserve dollars for other necessary programs. How are we as individual physicians to solve this guns-vs-butter dilemma? One way is illustrated in the article by Kuhn and Baker [4] in this issue of the *AJNR*. This important study shows that a volume of nonionic contrast media lower than that commonly administered in many centers produces equally diagnostic cranial CT scans. The cost differential between the medium containing 32 g of iodine and that containing 45 g resulted in a 34% decrease in the costs for contrast media. The implication of this savings of one third spread across the United States is obvious. More studies are needed to determine the most dose-effective strategies (i.e., the lowest dose possible for equally diagnostic procedures). In my own practice in the south Denver area, my colleagues and I have been using 35 g of iodine in a volume of 100 ml for essentially all CT scans that require use of low-osmolality contrast medium.

Although a one-third decrease in the cost of low-osmolality

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agents will have an enormous impact, are there other ways that we can decrease the total volume of these agents that we use? We may find that greater use of dynamic CT after single or multiple bolus injections makes it possible to use a lower dose of contrast medium that is just as effective in the clinical setting. High doses of contrast agents and delayed scanning techniques were used in the past to detect subtle intracranial tumors and inflammatory processes, but these techniques have been obviated by the increased use of MR imaging. Some researchers suggested that techniques might be developed to open the blood-brain barrier or to decrease excretion rates in order to decrease the volume of injected contrast medium. My own personal experience with disruption of the blood-brain barrier suggests that this cannot be done via the IV route and that it requires intraarterial injection of a high-osmolality agent, which may be dangerous. Altering excretion rates by dehydration or other physiological manipulations may lead to untoward adverse reactions.

If more dose-effective strategies are defined, resulting in the use of smaller volumes of low-osmolality contrast medium, it is imperative that the manufacturers provide a variety of packaged volumes and concentrations to accommodate specific needs. My colleagues and I still perform some myelography, primarily as a low-dose technique followed by CT scanning. It currently is cheaper to purchase a 50-ml vial of a low-osmolality agent at a concentration of 140 mg I/ml, use 5 ml, and throw the rest of it away than it is to dilute a standard 10-ml vial of a more concentrated solution. It is imperative that the manufacturers look closely into their manufacturing techniques and costs. I am confident that substantial savings can be found in this area alone.

Finally, but certainly not least, I wish to turn to the question of using ionic contrast agents after premedication with corticosteroids. Extensive work has been done by Lasser [5, 6] and others in an attempt to show that when the combination of high-osmolality contrast medium plus preprocedural medications, primarily corticosteroids, is used, the rate of occurrence of adverse reactions is equal to that seen when low-osmolality contrast medium alone is used, but at substantially less cost. Although there has been argument about the populations of patients evaluated and compared in the various national studies, Lasser [7] thinks that a direct comparison of similar populations in his study and the recent Katayama et al. [8] study shows that the prevalence of adverse reactions is the same for high-osmolality agents given after premedication as it is for low-osmolality agents given alone. One of the major arguments against this strategy, however, has been the lack of demonstrated compliance of patients in taking their premedications. One of my colleagues, Charles Seibert [9], recently has shown that a compliance rate of 98% can be achieved in both inpatients and outpatients if significant energy is devoted to the problem. The cost-conscious referring clinicians in the south Denver area have been eager to ensure that their referred patients be given the appropriate premedications before receiving high-osmolality IV contrast medium. Low-osmolality agents are reserved for specific categories of patients, particularly those who fail to take their premedications or who are added to the imaging schedule without sufficient time for premedications. That strategy has resulted in a 50% decrease in the potential expenditures for low-osmolality contrast media in our practice.

In summary, short of a national reimbursement policy or legislative edict requiring use of low-osmolality contrast media, we all face a financial dilemma. We need a combination of strategies. We need to explore more dose-effective regimens such as Kuhn and Baker [4] illustrate in their article. With such regimens, we may save at least one third of the dollars spent on low-osmolality agents. We need to reevaluate the role of ionic contrast media plus premedications. As in our practice, an additional 50% of the dollars normally reserved for low-osmolality contrast media may be saved. Finally, it is imperative that the manufacturers become more cost-conscious and cooperate with us in our efforts to lessen the economic burden. Whatever combination of strategies is used, it is necessary that each radiologist establish a protocol and continue to test it and to reevaluate it rather than hoping that some third-party genie will arise from a bottle to solve our dilemma.

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