In Reply—We appreciate the interest of Dr. Blumenthal et al. in our case report on intraneural administration of local anesthetic during an anterior approach of the sciatic nerve. We agree completely with these authors but would like to clarify a few details.

Our patients had been included in a study intended to evaluate the accessibility of the sciatic nerve using the anterior approach. We aimed at determining the reliability and stability of the catheter for postoperative analgesia in this approach. Despite this explanation of why we conducted these blocks in the computerized tomographic radiologic room, we believe that the near future will see an increasing participation of neuroimaging techniques in helping with anesthetic block procedures. Moreover, the sciatic nerve is hidden behind the minor trochanter in a nonnegligible proportion of patients (>10%) when we effect an anterior approach, independently of the rotation of the hip, and the risk of puncture of the femoral vessels exists. The computerized tomography-guided approach should help to avoid risks.

We agree with Blumenthal et al. in that, with the current state of our knowledge, the best praxis would have been to withdraw the catheter. This was what we did in the second patient reported. In the first patient, however, we were not aware of the intraneural puncture and anesthetic administration because the images were analyzed off-line.

The structure of the nerve trunk is complex (fig. 1). Basically, the nerves run along different body compartments surrounded by tissues with their own fascia. These fascias, which are not part of the nerve, are the “recommended points” for injection to avoid nerve damage or, that is what we thought. Inside the nerve trunk, the axons, enwrapped by the endoneurium, are grouped in fascicles that are embedded in loose connective tissue, the epineurium. The perineurium is the dense, lamellated, fibrous sheath that surrounds the fascicles containing the nerve fibers. Although injection into the perineurium could lead to neurologic damage, this is less likely with injection into the epineurium sheath.

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(Accepted for publication February 17, 2005.)

To the Editor—We read with interest the case report by Sala-Blanch et al. The authors describe an unorthodox but interesting treatment for patients undergoing continuous sciatic nerve block that raises several concerns. In short, using computed tomographic imaging without clear clinical indication, the authors documented that nerve stimulator-guided needle placement during sciatic nerve block through the anterior approach resulted in an intraneural needle placement. The authors then inserted the catheter and administered local anesthetics.

Conventional wisdom suggests that intraneural needle placement and catheter insertion should be avoided because intraneural application of local anesthetics has been shown to result in neurologic injury in animal models. However, despite the documented intraneural needle and catheter placement—although it is not clear whether the stimulating needle lies between fascia and epineurium or between epineurium and perineurium—the patients did not have neurologic injury. Therefore, this case report suggests that not all intraneural injections lead to neurologic injury. It also suggests that nerve stimulators may not be reliable in avoiding intraneural needle or catheter placement. Finally, a better definition of what constitutes an intraneural versus an intraneurapheal sheath injection during blockade of peripheral nerves and plexuses is needed for more meaningful discussion of this matter. Some experts may view the patient treatment in report by Sala-Blanch et al. unusual or even potentially hazardous. However, their findings should be welcomed because they clearly pose some important questions. At the least, they suggest that future research should continue to focus on developing more reliable and objective tools of nerve localization and injection monitoring techniques to help avoid intraneural injection and reduce the risk of consequent neurologic injury. In any case, it is recommended to withdraw the needle or the catheter if one has any doubt that its position is too close to the nerve, for the safety of regional anesthesia.

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epineurium is a slack collagen and fatty tissue, which contains the vasa and nervi nervorum. Most of the nerve section (between 30–75%) is occupied by nonneural structures. The sciatic nerve produces abundant epineurium, which covers between 72 and 78% of the nerve section.

Intraepineural injection of anesthetic would not necessarily lead to nerve damage. On the contrary, intrafascicular injection is more likely to induce nerve lesions. However, because of their elastic properties, the fascicles probably separate from each other and get out of the way if a needle penetrates the nerve trunk. Although direct neural tissue lesion is unlikely, it should be taken into account that intraepineural injection of a substance can cause an increase in neural pressure and secondary damage because of compression or a vascular lesion.

Clinical experience supports neurotransmittance as a safe and effective technique with minimal incidence of nerve lesions. However, a large number of unresolved questions stemming out from our observations remain: How often does intraepineural injection occur in routine practice? Does it occur preferentially in certain nerves? What are the clinical and radiologic signs suggesting intraneural puncture? What is the safe threshold for electrical near-nerve stimulation?

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Management of Anaphylactic Shock

To the Editor.—It was interesting to read the recent case report by Schummer et al. regarding management of anaphylactic shock. The use of vasopressin in anaphylactic shock is commendable.

However, before the use of vasopressin, two steps in the management of anaphylactic shock must be addressed. First, the simple measure of elevating the lower limbs could have helped to increase the venous return with vasodilatation, thereby contributing to an increase in blood pressure. This measure is well recommended in the management of anaphylactic shock.

Second, all colloids have been shown to produce clinical anaphylaxis. The overall incidence has been estimated to range between 0.03% and 0.22%. The last French survey of anaphylaxis during anesthesia demonstrated that 2.95% of anaphylactic cases were due to colloids. The incidence of anaphylaxis with succinylated gelatin solution (Gelsufate®; Serumwerk Bernburg AG, Bernburg, Germany) is 0.34%, whereas with hydroxyethyl starch (HES), it is one sixth of this, i.e., 0.06%. HES seems to be the safest colloid, and the incidence of immunoglobulin G antibodies against HES is rare in the general population.

However, this does not betoken the absolute safety of HES. Isotonic crystalloids are the recommended fluids during anaphylaxis, and rapid infusion of 1–4 l may be required to compensate for the peripheral vasodilatation that often accompanies anaphylaxis. The American Heart Association (Dallas, Texas), in collaboration with the International Liaison Committee on Resuscitation (Antwerp, Belgium), has endorsed the use of isotonic crystalloids in anaphylactic shock.

Although immediate discontinuation of the offending drug, Gelsufate®, was justified, we are skeptical of its replacement with other colloids with the potential, albeit low, for anaphylaxis. Patients might have developed anaphylaxis to HES, thereby obscuring the response to the conventional drugs, epinephrine and steroids. Although the authors performed skin testing for gelatin, no skin or immunologic test such as enzyme-linked immunoabsorbant assay for reactive antibodies to HES was performed to rule out its allergy.

Last but not least, minimal invasive direct coronary artery bypass grafting does not preclude the possible use of cardiopulmonary bypass. Considering the recent warning by the US Food and Drug Administration (Rockville, Maryland) regarding use of HES for cardiopulmonary bypass, its use over crystalloids does not seem to be justified in this case.

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In Reply.—We thank Drs. Mahajan and Gupta for their interest in our case report and appreciate the opportunity to reply.

Drs. Mahajan and Gupta obviously believe in algorithms. However, the complexity and severity of anaphylaxis is such that no single algorithm can adequately treat all cases. Anaphylaxis is generally an unanticipated severe allergic reaction, often rapid in onset, and starts within seconds to minutes after exposure to the allergen. Symptoms progress rapidly, can affect most organ systems, and can lead to cardiovascular collapse and death, even when appropriately treated. The management of anaphylaxis consists of withdrawing the offending drug, interrupting the effects of the preformed mediators that were released in response to the antigen, and preventing more mediator release.

The intention of our case report was to adjoin a practicable method to the management of anaphylaxis by considering the application of vasopressin to standard therapy as an approach for mediator-induced vasodilatory shock and not to add on a discussion about the right colloid.1

Yes, effective fluid therapy is a mainstay of treating critically ill patients. The ideal kind of volume replacement in this situation remains a matter of debate. Despite an immense number of contributions to this problem, there is no answer yet. This topic is often discussed emotionally rather than scientifically. The ideal solution should not only maintain gross hemodynamics, but organ perfusion and microcirculation should also be guaranteed or even improved. To treat hypovolemia, in Germany, colloids are used more often than crystalloids.

The lack of acceptance of synthetic colloids such as hydroxethyl starch (HES) as a solution for volume replacement is most likely due to reports on abnormal coagulation function. This cannot be used as an argument when new, modern HES preparations with low molecular weights (70,000 or 200,000 Da) and a low degree of substitution (0.5) are used. This is the commonly used priming solution of the cardiopulmonary bypass machine at our institution.2,3

In clinical practice, with the given situation of a high-risk patient with cardiovascular disease, being placed on the operation table for minimally invasive direct coronary artery bypass grafting, elevation of the legs and head-down tilt is not a suitable therapeutic option. Infusion of up to 4 l of a crystalloid is time-consuming and might end in fluid overload.

There was no need for skin testing of HES because further infusions did not provoke anaphylactic reactions. Furthermore, the cause of adverse reactions due to HES is not yet clear. Major histamine release is not known to occur.4 In a multicenter, prospective trial, 200,000 infusions of colloid volume substitutes have been examined. The frequency of severe reactions (shock, cardiac and/or respiratory arrest) was 0.006% for HES.5 HES-reactive antibodies are extremely rare, and they do not necessarily induce anaphylaxis.6 Also, there is no known cross-reactivity between the different colloids, so a particular allergy to one should not preclude the use of a different colloid.7

Tachycardia, a common symptom in anaphylaxis, may have devastating consequences, especially in patients with cardiovascular disease, and should be terminated as soon as possible. High-dose epinephrine, administered with the intention to stabilize hemodynamics, may cause cardiac fibrillation, whereas vasopressin increases perfusion pressures and has an antichaycyclic effect.8

Since the publication of our case report, we have gained more experience with the use of vasopressin in the management of anaphylactic shock beyond standard therapy. Administration of vasopressin, regardless of the causing agent (e.g., antibiotics, nonsteroidal antiinflammatory drugs), always stabilized hemodynamics quickly: The need for epinephrine reduced dramatically, and the heart rate normalized.

The management of anaphylactic shock must be immediate because time is running against the patient. Restoring cerebral and coronary perfusion quickly plays a pivotal role; therefore, one should consider the early addition of vasopressin complementary to standard therapy.


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Bupivacaine Spinal Block Cauda Equina Syndrome: Why Did It Happen?

To the Editor.—I was excited when I read the title “Severe Neurological Complications after Central Neuromaxx Blockades in Sweden 1990–1999.” I expected that the article would broaden my knowledge in this important aspect of anesthesiology. Although the article was very good and I commend the authors for their work, I was disappointed in one respect. The most surprising and new observation was that the authors uncovered 11 cases of cauda equina syndrome (CES) associated with bupivacaine spinal anesthesia. This finding is both eye opening and discouraging. It is discouraging because of all the local anesthetics used for spinal anesthesia, bupivacaine seems to be the safest. This is supported by the fact that a literature search of the terms cauda equina syndrome and bupivacaine turned up only four case reports. Furthermore, in vivo and in vitro studies show limited bupivacaine neuronal toxicity. However, in the report by Moen et al., bupivacaine caused the greatest number of cases of CES associated with spinal anesthesia. This could be due to the fact that bupivacaine is indeed neurotoxic in certain clinical situations and surfaces as neurotoxic in this report by Moen et al. because bupivacaine is more widely used for spinal anesthesia than are any of the other local

The above letter was sent to the author of the referenced Editorial View. The authors did not feel that a response was required.—Michael M. Todd, Editor-in-Chief

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 pacientes treated with aspirin, Horlocker et al. report the following large groups of complications (in addition to other but fewer complications): 33 spinal hematomas, 32 cases of CES, and 29 cases of purulent meningitis. Although the authors allot approximately 1,200 words to spinal hematoma, they expend only 272 words on CES. Furthermore, the authors mention the cases of CES only in the results section and provide no insight in the discussion regarding the “process of care” that resulted in previously unreported or underreported cases of bupivacaine CES of which they now hold the largest database.

It is not too late, however, and I would be pleased to have the authors provide more detail regarding the serious complication of the so-called bupivacaine CES. By informing us of the “process of care” or “what happened” in these cases, we may be able to prevent future occurrences.

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Why Do Orthopedic Patients Have a Higher Incidence of Serious Complications after Central Neuraxial Blockade?

To the Editor:—The authors should be congratulated on their comprehensive work “Severe Neurological Complications after Central Neuraxial Blockades in Sweden 1990–1999.” A variety of biases, which usually are inherent in such study designs, were successfully controlled. Considering previous data from the 1990s, the current incidence of complications is alarmingly high, but it stands in line with most recent respective surveys.

One question, however, deserves discussion. The authors described significantly higher incidence of spinal hematomas in the population of orthopedic patients, but the underlying causes remain partially unexplained. The authors presume that the high incidence may be related to low-molecular-weight heparin administration, which was introduced for thromboembolism prophylaxis during the study period.

In an 8yr survey regarding serious complications after regional anesthesia at our institution, we observed three spinal epidural hematomas in 28,933 central neuraxial blocks, of which two occurred in the subgroup of orthopedic patients (n = 4,205), indicating similar incidences and risk factors as reported by Moen et al.1 One of the hematomas was previously reported elsewhere,2 and the second one occurred after spinal anesthesia in a patient treated with unfractionated heparin. Both patients were concomitantly treated with nonsteroidal antiinflammatory drugs (NSAIDs), which were not considered a risk factor at that time. The third hematoma developed in a patient with heparin-induced thrombocytopenia during postoperative epidural pain therapy after hemipatectomy. No hematoma occurred in urologic (n = 10,817) or obstetric (n = 4,250) patients.

The discussion about the risk of spinal hematoma in patients with NSAID (antplatelet) therapy remains controversial. In orthopedic patients treated with aspirin, Horlocker et al. did not observe an increased risk of spinal hematoma during spinal anesthesia. However, in 1984, Cronberg et al.2 reported on the effects of NSAIDs on the second wave of aggregation, which was considered a key issue in our patient.7 In urologic patients (no hematoma in 10,817 neuraxial blocks), the risk profile regarding comorbidity and comedication is comparable to that of orthopedic patients, with the exception of concomitant therapy with NSAIDs.

We believe that the combination of heparin and NSAIDs in orthopedic patients is responsible for the higher risk of spinal hematoma in this group as compared with obstetric patients. Because pain therapy with NSAIDs is widespread in patients in need of (orthopedic) hip or knee joint replacement surgery, it would be of interest if the authors could provide any information regarding the concomitant use of NSAIDs in their cohort of orthopedic patients.

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(Accepted for publication February 17, 2005.)
To the Editor:—We strongly support reporting systems and therefore read with interest the Editorial View by Auroy et al.¹ However, before these methods become a standard audit or educational tool, some of their limitations must be considered further.

Clinicians can often select the type of adverse incident or outcome they will record. These tend to be those that are more severe, or those in accordance with individual perspectives of safety.²,³ For example, prolonged paralysis after a regional block is more likely to be reported than transitory paresthesia. Temporary complications are often ignored, despite their potential educational value. Sometimes, reporters select those incidents most likely to carry a message to the organization’s management.⁴ Incidents over inappropriate waiting times for patients or surgeons are not exceptional in anesthetic incident–reporting systems. Such selection and reporting biases may seriously distort perception of safety problems in anesthesia.

When reporting systems focus on near misses (prevented or mitigated adverse events), another difficulty arises, one familiar to aviation safety experts: information overload.⁴ A progressively larger amount of data is collected and stored to be further analyzed. It can become increasingly difficult and costly to classify and retrieve meaningful events in such an extensive system analysis.⁵ Gradually limited by resources and complexity, experts may end up fixing near misses instead of addressing system errors concealed behind the data overload. This may jeopardize the didactic value of such events.

Finally, anesthetic and medical practices in general are largely controlled by a professional body of knowledge.⁶ Organizational guidelines and standards are much less the norm than, for example, in chemical or nuclear industries.⁷ Variability in local practices, professional culture, and political context seriously challenge the generalizability of organizational analysis.

To address these problems, suggested approaches could include the use of international standardized definitions of incidents and the development of guided reporting through generic adverse event indicators. The specificities of the healthcare organization analyzed could also be more systematically described and addressed.

If limitations such as these are not well understood and properly addressed, case reports and root cause analyses of adverse incidents and near misses are likely to remain largely narrative and of limited educational value within the broader anesthetic community.

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Correspondence.

Cocaine abuse underwent general anesthesia for an open reduction and internal fixation of his left humerus. Successful in a patient without a history of CRPS who underwent an case using a stellate ganglion block to treat acute postoperative pain supports this practice, the efficacy of a stellate ganglion block has broader applications to patients regarding these drugs is more reliable than is the case with NSAIDs. Drs. Heller and Litz partially misinterpret our conclusions regarding the higher incidence of spinal hematoma among the orthopedic patients. We do not propose that this is exclusively related to the administration of low-molecular-weight heparin and spinal hematoma was much debated, we can assume that the information regarding these drugs is more reliable than is the case with NSAIDs.

Drs. Heller and Litz partially misinterpret our conclusions regarding the higher incidence of spinal hematoma among the orthopedic patients. We do not propose that this is exclusively related to the administration of low-molecular-weight heparin and spinal hematoma was much debated, we can assume that the information regarding these drugs is more reliable than is the case with NSAIDs.

The development of a symptomatic spinal hematoma is probably a multifactorial event, and NSAIDs, alone or in combination with thromboprophylaxis, might be one of these factors. Patients with spinal and vascular pathology might be more susceptible to alterations of platelet function. However, the opinion that NSAIDs are mainly responsible for the development of spinal hematoma in these patients could induce an ungrounded belief that epidural blockades are safe in orthopedic patients, permitted they refrain from taking NSAIDs. This solution seems too simplistic. Many data now indicate a high risk among orthopedic patients for spinal hematoma, particularly after epidural blockade. The use of epidural blockade for hip or knee replacement should be questioned because the risk seems out of proportion to the benefit.

Drs. Heller and Litz interestingly refer to three cases of spinal hematomas in their institution. However large and impressive, the total of 28,933 central neuraxial blockades does not permit reliable calculation of incidences, because spinal and obstetric anesthesia are included. The urologic patients, although of similar age to the orthopedic patients, include fewer females and usually, at least at our institutions, more often receive spinal blockade. These facts alone prevent any physiopathologic comparison between the two patient groups.

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Stellate Ganglion Blockade for Acute Postoperative Upper Extremity Pain

To the Editor.—We read with interest the review article by Dr. Reuben entitled ‘Preventing the Development of Complex Regional Pain Syndrome after Surgery.’ The author mentioned that in his practice, he administers a stellate ganglion block to patients with a history of complex regional pain syndrome (CRPS) undergoing upper extremity surgical procedures in an effort to prevent its recurrence. Although the literature supports this practice, the efficacy of a stellate ganglion block has broader applications to patients without a history of CRPS. No study has examined its use in the acute postoperative setting. Nevertheless, we report the first case using a stellate ganglion block to treat acute postoperative pain successfully in a patient without a history of CRPS who underwent an open reduction and internal fixation of his left humerus.

A 46-yr-old, 70kg male with a medical history significant for recent cocaine abuse underwent general anesthesia for an open reduction and internal fixation of a left humerus fracture. The 3-h intraoperative course was uneventful during a 5% desflurane in 50% nitrous and oxygen anesthetic. Fentanyl, 500 μg, and 5 mg morphine were also given intraoperatively. In the postanesthesia care unit, an additional 20 mg morphine was titrated for pain relief, although to no avail. The patient’s pain score remained 10 out of 10. On further evaluation, his left upper extremity appeared cold, clammy, and edematous, whereas the pain characteristic was described as burning.

After informed consent, a left stellate ganglion block was performed using 10 ml bupivacaine, 0.25%, with a sterile technique. Pain relief (0 out of 10) was achieved 5 min after injection. Evidence of successful blockade included paresis and miosis, temperature increase in the ipsilateral extremity, and an increase in perfusion index.

Numerous publications in the literature support the use of a stellate ganglion block for chronic sympathetically mediated pain; however, to the best of our knowledge, we report the first case in which a stellate ganglion block was used in the acute postoperative setting. Furthermore, the success of the block in absence of a history of CRPS illustrates primary prevention—interventions to prevent a disease from...
In Reply—I appreciate the comments by Drs. Kakazu and Julka. Although the role of the sympathetic nervous system in certain chronic pain states, including complex regional pain syndrome (CRPS), has been well documented, its role in acute pain and inflammation is still controversial. A coupling between the sensory afferent and sympathetic efferent system after peripheral nerve lesions has been previously described as a causative mechanism for neuropathic pain, including CRPS. However, the role of the sympathetic nervous system in acute pain still must be elucidated. The sympathetic nervous system may influence the nociceptive response to acute tissue injury in two ways. First, there is a potentiation of the chemical mediator cascade after trauma as well as augmentation of sensitization to substance P. Second, norepinephrine and 

sympathetic efferents in the fibers of joints of rats involves a cascade of events in which the mast cell and the sympathetic terminal are sequentially activated, resulting in plasma extravasation in the synovium. Further, adrenal medullary-derived epinephrine can excite and surgical or pharmacologic sympathectomy can decrease the severity of experimental arthritis. Although these behavioral studies in rats point to a potential role of the sympathetic nervous system in acute inflammatory pain, neurophysiologic studies of nociceptors in rats and psychophysical studies in humans have failed to provide confirmatory evidence for the role of sympathetic efferents in inflammatory pain and hyperalgesia.

The use of a stellate ganglion block for acute postoperative pain as described by Drs. Kakazu and Julka is intriguing. I agree with the authors that because this patient sustained his fracture 1 week before surgery, many of our surgeons now request that we routinely perform stellate ganglion block. These case studies highlight the importance of moving from symptom control toward a mechanism-specific pharmacologic management of postsurgical CRPS. Overall, we share the same enthusiasm of Dr. Ruben on regional anesthetic techniques to prevent the occurrence of CRPS. In our clinical practice, it is not only important to focus on CRPS prevention, but also to understand the pathophysiology so that we know which patients are at greatest risk.

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David C. Warltier, M.D., Ph.D., acted as Handling Editor for this Correspondence.

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Air Venting and In-line Intravenous Fluid Warming for Pediatrics

To the Editor—It is important to have suitable fluid warmers for pediatric anesthesia, especially in hypovolemic neonates and infants who require boluses of isotonic crystalloid, packed erythrocytes, or both given over 5–20 min. The purpose of this study was to evaluate the fluid warming and air venting capability of a new device (buddy fluid warmer; Belmont Instrument Corp., Billerica, MA) designed for use in pediatrics. With this device, fluids are heated to 38°C as they pass through a disposable set containing microporous membranes able to vent air. Air is released through the side vents of the set. The small heating unit and disposable set are placed in-line near the patient at the intravenous infusion site and can be used easily with volumetric infusion pumps.

Fluids tested were lactated Ringer’s solution, 1 l, at room temperature, and refrigerated, outdated erythrocytes diluted with 100 ml saline, 0.9%. The estimated hematocrit was 50%. Standard or Y-type blood solution sets were attached proximal to the commercial microheater disposable set (priming volume, 4 ml), which was connected to a 12.7 cm T connector (total volume, 0.4 ml). A rapid response thermocouple (Fluke 51 II; Fluke Corp., Everett, WA; accuracy, ±0.05%) was used to measure distal temperature at the point at which the T connector would be attached to the intravenous line. Temperature data were collected at 5 ml intervals for flows of 8 ml/min or greater and at 10+ intervals for slower flows. A volumetric infusion pump was used to regulate flow between 50 and 1,000 ml/h. For gravity-free flow, lactated Ringer’s solution was infused from a height of 1.8 m into a cylindrical scored beaker, and measurements were made every 50 ml. Pressure-driven flow was not used, per manufacturer guidelines.

A three-way stopcock with a 0.8 m extension was inserted proximal to the microheater, and a 22-gauge Angiocath (Becton Dickinson, Sandy, UT) was attached to the T connector distally. The Angiocath was submerged in a liquid-filled beaker for crystalloid infusion and attached to a cell salvage waste system for erythrocytes. Without the fluid warmer disposable set, injection of as little as 1 ml of air was readily visible in the liquid-filled beaker with submerged Angiocath. Aliquots of 5, 10, 20, 30, 40, 50, and 60 ml of air were rapidly injected into the stopcock toward the patient infusion site, followed by resumption of fluid flow. Visual inspection for air bubbles distal to the warmer and measurements were made every 50 ml. Pressure-driven flow was not used, per manufacturer guidelines.

Distal temperatures are summarized in figure 1. Air bubbles were not seen in the T connector or in the liquid-filled beaker for any value of injected air.

The buddy fluid warmer was effective in delivering warm intravenous fluids at flows of 7 ml/min or greater. At the slowest flows, infusate temperature decreased, likely resulting from significant heat loss distal to the warmer. Venting of air by the fluid warmer is of great advantage to pediatric patients with congenital heart disease. Moreover, use of this warming device might theoretically reduce the risk of accidental infusion of air during crystalloid and blood resuscitation of children with hypovolemic shock. The manufacturer’s list price for the buddy fluid warmer is $1,599.00; the disposable set is $14.99.

The authors thank Jeanne Javor, M.T. (A.S.C.P.), S.B.B. (Blood Bank Supervisor, MetroHealth Medical Center, Cleveland, Ohio), for providing outdated erythrocytes and hematocrit estimates; Richard Kramer, C.P.P. (Division of Cardiothoracic Surgery, MetroHealth Medical Center), for useful suggestions; and Denise Kosty Sweeney, R.N., M.S.N. (Administrative Nurse Manager, General Clinical Research Center, MetroHealth Medical Center), for the loan of a stopwatch and beaker.

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Using the Bonfils Intubation Fiberscope with a Double-lumen Tracheal Tube

To the Editor—Several surgical procedures require single-lung ventilation. Because a double-lumen tube (DLT) allows for independent ventilation therapy (e.g., continuous positive airway pressure), suctioning, and bronchoscopy of each lung, the DLT is the accepted standard for the treatment of patients undergoing thoracic surgery. A difficult intubation in this subset of patients is particularly challenging because tube insertion is impeded by the special shape of the DLT and the two separate cuffs, which can be damaged by the patient’s teeth and during repeated insertion maneuvers using intubation tools with sharp surfaces.

Recently, in two patients scheduled to undergo a minimally invasive direct coronary artery bypass procedure requiring DLT insertion, direct laryngoscopy failed. Because at our institution the Bonfils intubation fiberscope (Karl Storz GmbH, Tuttingen, Germany), a rigid fiber-
To the Editor:—Ultrasound-guided regional anesthesia is an emerging field that potentially provides better block efficacy than other current techniques. 1–3 In particular, ultrasound-guided axillary block had been described as an excellent technique for brachial plexus anesthesia. 4,5 With this method, a short axis (transverse cross-sectional) view of the axillary artery and surrounding nerves is obtained with the block needle approaching from the lateral aspect of the arm in the plane of imaging. Although V-shaped redirection of the block needle can be used to place local anesthetic on the superficial and deep sides of the axillary artery, transarterial placement of the needle may occur during the procedure.

During an ultrasound-guided axillary block, we observed a bent echo of the 25-gauge 3.8-cm Quincke tip needle (Becton Dickinson and Company, Franklin Lakes, NJ). The needle shaft echo was bent toward the skin surface when the needle crossed the axillary artery (fig. 1). When examined after the procedure, the injection needle was perfectly straight.

Described as a “bayonet artifact,” this ultrasound artifact causes apparent needle deformity and has been reported during breast biopsy in which a needle traverses a tumor surrounded by fat tissue. 6 Bayonet artifact occurs when the ultrasound beam passes through tissue with different speeds of sound. Similar speed of sound artifacts have been described in the soft tissues of the kidney. 7–9 Because all commercial ultrasound machines assume a uniform speed of sound of 1,540 m/s, 10 actual differences among speeds of sound in tissue change the appearance of the needle shaft.
The basic premise of the in-plane approach for ultrasound-guided regional blockade is that precise placement of the block needle tip near nerves is possible in real time. However, there are circumstances under which the actual needle position and perceived image do not agree. Here, we describe one of those circumstances that occurred during transarterial axillary block.

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