Epidural local anesthetics have several benefits in addition to providing excellent pain relief. For example, they are very effective in shortening the duration of ileus after abdominal surgery.\(^1\) They also effectively decrease the incidence of thrombosis, even in patients already on anticoagulants.\(^2\) The mechanisms behind these effects are not well understood, but it is conceivable that inflammatory modulatory effects of local anesthetics absorbed from the epidural space may contribute to these effects. If so, similar benefits could be obtained by intravenous administration of local anesthetics, and this has indeed been shown to be the case. This is of clinical interest, as many patients can not or will not have epidurals placed, even if they would potentially benefit from their use.

The molecular mechanisms of these actions have not been elucidated, but local anesthetics have well-defined effects on the inflammatory system that might be of relevance. For example, they prevent overactivation of neutrophils without interfering with their normal function (i.e. they block priming without interfering with activation).\(^3\) If this action is relevant, then one would expect intravenous local anesthetics to interfere with excessive physiologic responses to surgery (e.g. thrombosis) without interfering with normal responses (e.g. not inducing bleeding). In addition, if priming of neutrophils can be avoided during the immediate perioperative period, effects would be expected to outlast the duration of the local anesthetic. Such seems indeed to be the case.

The most conclusive data on the benefits of intravenous local anesthetics are on the topics of coagulation, bowel function, and pain, with several meta-analyses now confirming these benefits. For example, intravenous local anesthetics decreased the incidence of deep venous thrombosis after hip replacement (without anticoagulation) from approximately 80% to less than 20%, but without increasing bleeding complications.\(^4\) The ability of intravenous local anesthetics to prevent “windup” of pain responses after repeated stimulation has been well documented in volunteer studies, and in a variety of models: finger web pinch,\(^5\) skin incision,\(^6\) and burns.\(^7\) In these models, pain as well as hyperalgesia were reduced. As anticipated from this ability to reduce pain, intravenous local anesthetics also reduce anesthetic requirements during surgery, by approximately 30%.\(^8\) In clinical trials, intravenous lidocaine has been effective in providing long-lasting pain relief, in particular after abdominal surgery. In prostatectomy, laparoscopic colectomy, other types of abdominal surgery\(^9\) and outpatient surgery,\(^10\) pain and morphine consumption were decreased. Although not all studies found this benefit,\(^11\) a recent meta-analysis confirmed these findings in abdominal surgery.\(^12\)

Duration of ileus is also reduced significantly by intravenous local anesthetics in settings such as prostatectomy\(^13\) and colectomy.\(^14\)\(^15\)\(^16\) Probably as a result of this benefit, length of hospitalization after abdominal surgery has been consistently reduced by approximately 1 day.\(^17\)

Many of these benefits mimic those of epidurals. Indeed, in a direct comparison of epidural bupivacaine and intravenous lidocaine after colectomy, no significant differences were observed between the techniques in pain scores, opiate consumption, duration of ileus, time to oral food intake and time to hospital discharge.\(^18\) But there are differences between the techniques. Importantly, these benefits of intravenous local anesthetics seem to depend on type of surgery, and have not been found after hip replacement or abdominal hysterectomy.\(^19\)

In summary, intravenous local anesthetics can function effectively as a “poor man’s epidural” in patients undergoing abdominal procedures, who can not or will not have an epidural placed.

REFERENCES


