

## Baker Pharmaceutical

Baker Pharmaceutical has developed a dramatically new form of heparin, an anticoagulant that reduces the risk of blood clots for patients undergoing major surgery – procedures like abdominal surgery and hip or knee replacement.

With such procedures, the risk of a blood clot – a pulmonary embolism or deep venous thrombosis - can be quite high, in the range of 20-30%. For a broad class of patients, anticoagulants significantly reduce that risk, to something more like 6-9%. They also increase a second risk, however, that of post-operative hemorrhage, or bleeding.

Since the 1940's, a standard form of heparin has been used as the generally preferred treatment for clot prevention. It was available from a variety of suppliers, at a price of about \$3.00 per dose.

Baker Pharmaceutical's new heparin, called Lowparin, was extracted from standard heparin through a patented process of enzymatic depolymerization. The process produced a compound roughly one-fourth the molecular weight of ordinary, unfractionated heparin. This new compound exhibited several properties distinct from those of standard heparin. From the user's perspective, one of the most important was that it yielded a very predictable dose response. As a result, Lowparin usually required neither monitoring of blood parameters nor dosage adjustments during use, as was the case with all of the standard heparins. Where a hospital could easily expend \$50 in resources (for monitoring and lab tests) over a course of treatment with standard heparin (usually 4 injections), such costs could usually be avoided with Lowparin. (A course of treatment with Lowparin usually involved just two injections. An injection usually cost a hospital about \$2.00 in a nurse's time.)

As part of the process of deciding how it should position and price Lowparin in the anticoagulant market, Baker had assembled two different types of data:

1. Data on Lowparin's performance relative to standard heparin, both in preventing venous thrombosis and in avoiding post-operative bleeding.
2. Data on the costs to hospitals of treating these two conditions when they occur following major surgery.

### Comparative performance data

Baker had assembled comparative performance data for different types of major surgery, including hip replacement, knee replacement, and abdominal surgery. The following data deal just with abdominal surgery. They were obtained from a series of randomized, controlled trials.

Incidence of adverse events following abdominal surgery			
	No <u>Heparin</u>	Standard <u>Heparin</u>	<u>Lowparin</u>
Venous thrombosis	25%	7%	5%
Bleeding	3%	9%	10%

*Baker Pharmaceutical (continued)*

### **Hospital costs associated with adverse post-operative events**

*Post-operative clotting.* For a patient who must return to the hospital due to post-operative clotting – whether deep venous thrombosis or a pulmonary embolism – the average length of stay was 4 days. A reasonable estimate of the cost of a day's basic care at a typical, well-managed community hospital was roughly \$840 / day.

Of those patients who must return to the hospital for treatment, 60% came by ambulance and received initial treatment either in the ambulance or in the hospital's emergency room. On average, the cost of delivering such service was \$420 / incident.

The average cost of drug therapy for post-operative clotting was roughly \$460 / patient; while lab costs amounted to about \$770. Of the patients who returned to a hospital for treatment of either deep venous thrombosis or a pulmonary embolism, about 20% ended up requiring further surgery, at an average cost of \$5,300.

*Post-operative bleeding.* For a patient who must return to the hospital due to post-operative bleeding, the average length of stay was 2 days. Of those who returned, 40% came by ambulance and received initial treatment in the ambulance itself or in the hospital's emergency room.

The average cost of drug therapy for post-operative bleeding was roughly \$320 / patient; while lab costs were about \$200. Of the patients who return to a hospital for treatment of post-operative bleeding, about 15% required further surgery, at an average cost of \$2,900.