An Industry Based, Retrospective, Cost Analysis of Vertebral Axial Decompression vs. Surgery for Lumbar Disc Disease: 10 Case Studies.

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Cost of medical care, from drugs and band-aids to surgery and long-term care is a hotly debated topic in the medical and lay press. The authors undertook this small collection of case studies to access differing costs associated with a relatively new treatment for lumbar disc disease and the old "gold-standard", surgery. In the genera of modern television, two differing views of the same problem were included. That of industry, which is represented by the HR director of the participating oil refinery, and that of medicine, was represented by the M.D. supervising the medical treatment of those patients not receiving surgery. The introduction is divided to represent these viewpoints.

Human Resource Introduction

This study was undertaken to explore creative suggestions in controlling benefits costs while maintaining an overall competitive health care package; reducing pain, suffering, and absenteeism in the company workforce; and reducing the associated costs of medical insurance and employee absences to the company. The "costs" data for this paper was derived from a five (5) year study involving 10 employee case files from a small petrochemical refinery and the experience gained in the diverse worlds of medicine and business.

One of the biggest challenges facing employers today is how to strike a balance in controlling benefits costs while maintaining an overall competitive health care package for the workforce. It is no secret that benefits costs, particularly health care costs, are escalating.

Double-digit increases are projected over the next several years according to a number of leading benefits consulting firms. ***(Hewitt Associates, 2002, Philadelphia Business Journal, 2002)*** Hewitt Associates is projecting a 15.4 percent average increase for 2003 and this comes after last year's rate hike of 13.7 percent. This marks the highest increase since the early 1990s. "Unless there is a fundamental change in the way health care is delivered, costs will double in the next five years," said Jack Bruner, national health care practice leader, Hewitt Associates. "This is a major concern for senior management as it impacts the bottom line of companies across the country." ***(Hewitt Associates, 2002)*** Health benefit costs for U.S. employers rose 14 percent in 2002, and are expected to increase by 15 to 20 percent in 2003, according to a report released in August 2002 by the Philadelphia based Hay Group. "This is a very difficult time for companies to cope with double-digit medical premium rate increases," said Michael Carter, vice president in Hay Group's benefits practice. "In the current business

environment, most companies simply cannot afford to pass these costs along to their customers." ***(Philadelphia Business Journal, 2002)***

You do not have to be a benefits expert in light of the forgoing projections to understand that any reduction in health care expense would be a positive move for a company. You must, however, face the added challenge of controlling these costs while providing a competitive package. Employers must be creative and "think out-of-the-box." Benefits will continue to be one of the top recruiting and retention tools for a productive workforce. How employers manage the design, cost and administration will distinguish them as an "employer of choice."

Although the decision algorithm of the physician (efficacy and safety) is important to industry as well, employers bear the cost and must consider the cost. The American College of Occupational and Environmental Medicine reports, "Ninety percent (90%) of adults in North America experience an acute episode of low-back pain at least once in their lives." Additionally, the COEM continues, "Costs associated with compensable low-back injuries are estimated at $50 billion to $100 billion a year, with only one-third of that amount representing medical expenses. The remaining two-thirds include non-medical costs for income replacement indemnity, service benefits and medical legal expenses. (American College of Occupational and Environmental Medicine, 1998).

The number one reason Americans miss work, after the common cold, is back injuries. The ever-escalating costs of providing excellence in medical treatment for our employees have far reaching effects. As our costs rise we must place controls on our expenses to limit the rise in product price. We are forced to resort to strategies that become progressively more draconian. We limit out health care by selecting managed care and generic pharmaceuticals. We then outsource the very management of our health care to an entity that is selected because it produces a 'lower utilization" of resources. We export production to other countries with lower "costs". This in turn necessitates that reduce our work force. We watch as other industries work within this model and see industry giants in petrochemicals, finance, and transportation in bankruptcies that would have been unimaginable even ten years ago. We must be open to creative solutions.

Medical Introduction

Physicians traditionally consider cost last when determining proper medical treatment. Physicians are more concerned with risk-benefit ratios and consideration of cost may place the patient at risk of receiving sub-optimal care. Back injuries are the single largest medical expense for work related injuries. It is time that we broaden our scope of vision and seek more effective and less expensive methods of treatment. For those that have invested a lifetime of study to a specific mode of treatment this change will be challenging both academically and financially. This challenge is not new. General surgeons faced it and prospered following the introduction of Cimetidine 25 years ago. Surgeries for "peptic ulcer disease" accounted for a full 1/3 of surgeries performed and they disappeared almost overnight.

First and foremost we must consider our patients. But we must consider them within the totality of their life. Perhaps a little more of the Family Medicine viewpoint and a little less of the lumbar spinal surgery specialist viewpoint is in order. If we treat a person, but he no longer has a job to support his family have we helped our patient? If we treat many such patients and as a result their industry is shipped overseas or goes bankrupt because of uncontrollable costs, have we helped our patient? I think not. We must always be the patient's unrelenting advocate in preventing and decreasing suffering, but we must open our horizons and provide our expertise to industry so that the best care can also be affordable.

When in medical school, I first heard the parable about the toolbox. I will paraphrase it here, as it is quite apropos. If the only tool in a physician's toolbox is a hammer, every problem looks like a nail. It is time to add other tools. VAD is also in my toolbox. It cannot fix every problem nor is it safe in every circumstance. I frequently call for a hammer, but in many cases where I previously would use a hammer, it stays in the toolbox.

The Human Resource administrator is the person who must wear two hats for industry. He is a patient advocate and an industry protector. Five years ago, a novel agreement was reached through the efforts of the HR administrator of a petrochemical refinery and with the refinery's corporate Medical Director. This limited study was undertaken to determine if a much less expensive mode of treatment would be at least as effective as surgery and provide a measure of cost control for the industry

The agreement offers refinery employees, Vertebral Axial Decompression (VAD) utilizing the Vax-D (the only scientifically validated methodology that produces negative intradiscal pressure), as a self-selected alternative to back surgery. This agreement was not planned as a research tool, but as an open-ended, non-blinded, outcome based trial. The trial was justified by the success rate demonstrated in previously published Vax-D studies. [3,4,5,6,7]

To qualify for Vax-D, the worker was required to meet four requirements.

1. Have sustained an acute traumatic or cumulative back injury for which surgery had been recommended.
2. Have a symptom history for a minimum of 3 months.
3. Meet the inclusion criteria for Vax-D.
4. Not have any of the exclusion criteria for Vax-D.

Over the last 5 years, despite an excellent safety record at the refinery and strict adherence to OSHA standards, there have been 10 cases meeting the above criteria (three work related and seven non-work related). Of these employees, 5 elected to have surgery and 5 elected VAD.

This presented a unique opportunity to access the "cost" of therapy. The company is self insured, and provides excellent coverage for its employees. All medical costs were paid by the company and were monitored by the HR administrator. Additionally, non-medical costs such as medical leave pay, replacement worker pay, permanent partial disability award, and, unfortunately, one case of permanent total disability award could also be tracked and determined. A true cost to the employer, the ultimate payee, was determined by including these "non-medical" costs of care.

The following tables describe the outcomes of the surgical group and the VAD group.

Medical Outcomes

	Surgery	**Vax-D**
Number of Patients	5	5
Total Procedures	11	6
Initial Outcome	All report some daily back pain	All report pain free
Current Outcome	3 re-operated a second time 1 operated a total of 5 times 1 on long term permanent disability 1 is candidate for permanent partial disability. Three were not work related.	1 retreated a second time All working

The re-operations were due to continued pain and/or pain at a different level.
The re-Vax-D was due to a traumatic injury that occurred, while building a retaining wall of railroad ties at a lake house 2 ½ years after the initial Vax-D treatment.

Medical Outcomes

This limited series suggests that Vertebral Axial Decompression (Vax-D) can provide improved medical outcomes in patients with lumbar disc disease when compared to surgery. These data further suggest that this is accomplished with minimal risk.

Cost Outcomes

	Surgery	**Vax-D**
Time off work	17.6 weeks average The four patients that returned to work averaged 9 weeks TTD. The one now on PTD was on TTD for 52 weeks prior to adjudication.	36.75 hours
Average wage	$22.50/hr.	$22.50/hr.
Total Wages Paid while off work	$15,840 each *	$826 each
Average overtime wage	$33.75/hr	N/A
Total Overtime	$23,760 each*	None+
PTD/PPD	PTD $672,000 for one PPD is pending on one and averages $54,142	None
Procedures cost	$263,434 Average = $52,687/person	$5,685 - $6826 Average = $6,227/person
Total Cash-Cost to the employer	***$237,515 each***	***$6,227 each****

Discussion

Assumptions:

Cost is determined by the amount of money that changed hands.

> *The reciprocal of cost is therefore revenue. The medical community primarily views "cost" from the perspective of "medical revenue". This perspective greatly underestimates industry cost. The business community views cost in a much more complicated way. It consists of direct medical expenses, employee wages for the injured and replacement worker, indirect expenses including legal, and indirect expenses including lost productivity. This process often overestimates real costs. Although "Lost Productivity" was clearly much greater in those patients who underwent surgery, we have deleted it from our calculations as it varies dramatically from industry to industry and is the most difficult aspect to calculate with precision. We are then left with actual dollar expense incurred by the employer.*

"Medical costs" include ER visits, medications, diagnostic studies, braces, physical therapy, provider visits prior to and following the procedure, and the medical procedure (surgery and/or Vax-D).

"Cost to Industry" starts with "medical costs" and then includes wages for the worker and replacement worker as well as paid indirect expenses including legal and disability. This represents the actual dollars spent or "cash-cost to industry" of a medical procedure. It does not include intangible, but real costs such as lost productivity. It also does not attempt to measure the ability of the patient to work and earn at the same level post treatment.

Efficacy of surgery We demonstrated a 60% "failure" rate of the initial surgery over a 5-year period. Many would argue that this rate of failure may be excessive, although recent reviews of back procedures (laminectomy discectomy with fusion) suggests that this may actually underestimate the failure rate. [1] However, in the following calculations, we have assumed surgery to be the gold standard, and 100% successful.

Efficacy of Vax-D A 100% "success" rate in this small group over-estimates the published efficacy of 70%. Calculations will be made assuming the published 70% success rate.

We recognize that these assumptions over-estimate surgical success and under-estimate VAD success as Vax-D "failures" generally are improved sufficiently to avoid surgery. [2]

Duration of efficacy for surgery is difficult to assess. Several different surgical procedures were undertaken, however, such is also the case in practice. Choice and frequency of surgical procedure seems to be more closely related to the number of available surgeons than any other criteria. [1]

Duration of efficacy for Vax-D has recently been demonstrated to be nearly 100% at 4 years. Those patients (70%) who achieved initial success did not regress over a 4-year period. [2]

Safety of surgery is well reported in the medical literature. Serious complications, other than the need for re-operation, are relatively rare. Death is extremely rare. Although rare, these complications do occur. No serious safety problems, other than 6 re-operations, were present in this study.

Safety of Vax-D has not been specifically reported in the medical literature. Personal experience and discussion with the authors of previous studies produced no experience of medical injury related to the use of VAD when following Vax-D protocols. At this time there are approximately 1500 Vax-D procedures done daily. There has been only one reported significant, but not life-threatening injury in the last 15 years. No safety problems were present in this study.

Utilizing the actual cost experience to the refinery and the above assumptions, calculations of cost savings to industry were determined for 100 eligible patients treated with Vax-D and assuming that the 30% that failed Vax-D would then undergo surgery. These were then compared to an identical group of patients being treated with conventional surgery alone.

The average, per patient, "cash-cost to industry" for the surgery treated injury was $263,434. The average, per patient, "cash-cost to industry" for the Vax-D treated injury was $6,227.

100 patients treated with Vax-D would cost industry $622,700 dollars, using these assumptions, thirty would not have satisfactory results. *(Although it is our experience that most of those Vax-D "failures" would have had sufficient improvement to no longer elect surgery, for these calculations, we assume all of the Vax-D failures would subsequently undergo surgery.)* The cost to industry for surgery on these 30 patients is $7,125,450. "Cash-cost to industry" to treat 100 patients using Vax-D as a preferred treatment followed by surgery in Vax-D failures would be $7,748,161. Actual cost could be substantially less with additional savings of $237,515 for each of the 30 VAD failures that were sufficiently improved to avoid surgery.

To treat the same patients with only surgery would have a "cash-cost to industry" of $23,751,500. **The inclusion of Vax-D as a necessary step for qualifying patients who fail conservative treatment, would save industry a minimum of $23,000,000 in direct costs for every 100 patients treated.**

Author's note: The term Vertebral Axial Decompression has been noted interchangeably utilizing two acronyms Vax-D and VAD. Perhaps the generic term VAD would be more accurate as Vax-D is a protected term of the company that manufactures the equipment that I use. However, as there are several manufacturers that produce equipment that can distract the lumbar spine in an axial orientation there is only one that can demonstrate profound negative pressures when doing so.

That is the Vax-D. Without the negative pressures there is no medical evidence for medical success.

It is not within the scope of this paper to delve into the physiology and physics of why this is so. This information is available elsewhere. The scope of this paper is limited to an appraisal of "costs" of surgery as compared to VAD only when the VAD is accomplished with the Vax-D equipment.

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