Management

An Introduction to the Theory of Constraint and How it Can Be Applied to Medical Management

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IN THIS ARTICLE...

This overview of a new way of thinking about medical management problems could help physicians executives think about those problems differently.

Case 1

Outpatient 1

Doctor: Patient A, it seems that your liver is still under stress. Have you been taking a “liver rest day” as we discussed before?

Patient A: Well… during the week, whatever I try, I end up meeting with people and have a drink. And on the weekend, I can’t feel like I’ve really rested without a drink.

Doctor: But if you carry on like this, your liver will come under more and more stress.

Patient A: I understand what you’re saying, but I just can’t...

Case 2

On the ward

Doctor: I was thinking of including XXX process during the morning examinations from now on.

Staff member: That’s impossible. We just don’t have the capacity to do that.

Doctor: But, if we were to do the XXX in the wards before the examination, then we could increase the number of patients we examine in a day.

Staff member: We’re also doing our best. It’s just we don’t have time to do anything else.
If the physician diagnoses the condition as pneumonia, he or she will prescribe antibiotics effective against the pathogenic bacteria and order appropriate supportive therapy. If the subject is a “disorder,” we physicians are able to conduct this type of appropriate diagnosis and treatment. But if the subject is “management,” we frequently end up turning to “home remedies.” TOC is a theory that provides a framework of “diagnosis and treatment” in management. This diagnosis and treatment in management is called “selection and focus.”

In TOC, single undesirable effects are not regarded as problems in themselves, but rather as “symptoms” expressed by the bigger problem. Think of it as physicians who see a patient with chief complaints of a cough, fever, sore throat, and a chill. Would we prescribe cough medicine for the cough, an antipyretic for the fever, an anti-inflammatory for the sore throat, and recommend cooling for the chill?

This would probably be inappropriate symptomatic treatment (home remedies). A physician would listen to the patient’s chest with a stethoscope, and if they heard crackling, they would order a chest radiograph. If the physician diagnoses the condition as pneumonia, he or she will prescribe antibiotics effective against the pathogenic bacteria and order appropriate supportive therapy.

If the subject is a “disorder,” we physicians are able to conduct this type of appropriate diagnosis and treatment. But if the subject is “management,” we frequently end up turning to “home remedies.” TOC is a theory that provides a framework of “diagnosis and treatment” in management. This diagnosis and treatment in management is called “selection and focus.”

Each of these four cases is a typical problem to which the Theory of Constraint (TOC) can be applied. The TOC has produced significant results in the manufacturing and construction industries, and is now being applied to medicine.

In TOC, the above situations are called undesirable effects. In management, we encounter numerous undesirable effects, and during problem-solving we tend to tackle these undesirable effects one by one. As we solve one undesirable effect, a new one arises. It is just like a firefighter chasing one fire after another.

In the physician common room

**Junior doctor:** Dr. B, I just can’t go on!

**Senior doctor:** Is there some kind of problem?

**Junior doctor:** It’s like this, but I just don’t know what to do anymore…

**Senior doctor:** Well then, what if we were to do this?

**Junior doctor:** But would that really work all that well?

**Senior doctor:** Alright then. What about this?

**Junior doctor:** But if we do that, then if this happens, I’d be at a loss at what to do.

Case 3

**Outpatient 2**

**Staff member:** There’s a phone call from the ward.

**Doctor:** Right, well, I’m busy with outpatients at the moment. They couldn’t make it later could they?

**Staff member:** They say it’s urgent and need to talk to you now.

**Ward:** It was mentioned that you were to change Patient C’s prescription, but the prescription closing time is 1 o’clock, and I was hoping you could hurry. [Doctor checks the electronic chart of the patient in the ward, and places an order.]

**Doctor:** Alright then, umm… where were we with the previous patient’s chart? And who were we looking at next? I can’t remember.
Outline of TOC

The basis on which TOC is established is logic-based problem-solving. In TOC, we engage in systematic thinking that uses two types of logic: necessity and causality.

The necessity and causality referred to here are more than just epidemiologically proven evidence with which we are familiar. It would also be fair to regard people’s common sense as part of the causes and effects.

For example, consider the statement that “french-fries need ketchup.” If this statement is acceptable to the target persons, then it will be perceived as a necessity. In TOC, expressions are made using words that merge hard science and soft science, and it is also possible to skillfully combine evidence and narratives. To better understand TOC, here are three principles underlying the philosophy.

Total optimization

The first principle is total optimization. Importance is placed upon the whole organization proceeding toward a goal. In TOC, the performance standard of this goal is defined as throughput. In medicine, defining this throughput is difficult since we do not have single performance measurement.

However, we believe that it can be expressed using six functions of the six Ds (death, diseases, dissatisfaction, discomfort, disability, destitution (cost)) as defined by Fletcher and others.2

In other words, throughput is the difference between the positive outcomes and the negative outcomes.

If a person suffers an external wound or other acute disorder, then there is a possibility that the importance of death will be high; and if it is a chronic disorder, then there is a chance that the importance of disability will be high.

In resource-limited situations such as disasters, taking account of costs will probably become important. It can also be argued that one of the requirements of physician executives is the ability to define these throughputs according to circumstances.

Constraints

The second principle is to focus on constraints. In TOC, the importance of constraints is explained using the analogy of a chain (Figure 1). If the chain in Figure 1 is pulled vigorously at both ends, where will it break?

In Figure 1, the center link is the weakest and it is thought the chain will break here. The strength of the entire chain is determined by this constraint. Unless this constraint is strengthened, for example, even if other links were made thicker, the strength of the overall chain would not change. This way of thinking is called the throughput world.

In contrast, it could be argued that strengthening individual links of the chain would increase the weight of the chain. If any links in the chain are made heavier, the overall weight of the chain will increase.

In TOC, we think of the strength of the chain as throughput, and the weight of the chain as cost. Moreover, the line of thinking that places emphasis on throughput is called the throughput world, and the line of thinking that emphasizes costs is called the cost world.

Increasing efficiencies in individual departments and strengthening resources becomes partial optimization, whereas throughput is regarded as something designed for total optimization.

Incorrect restructuring leading to cuts in human resources in areas of importance (namely constraints), may...
Consider this short story:

Doctor O has an extremely good reputation, and her outpatient schedule is always full. She always strives to keep the time she spends with each patient as short as possible, but in order to treat the patients properly, she needs 10 minutes with each patient.

Measuring Behavior

The third principle is PMB (policy-measurement-behavior). Almost all people belonging to an organization try to act for the benefit of the organization. That raises the question: When determining whether their behavior is for the benefit of the organization, on what do they base their decision? The answer is: How is the organization evaluating me?

In the book, *Haystack Syndrome*, Goldratt presents the behavioral principle: “Tell me how you measure me, and I will tell you how I will behave.”

Not just result in a reduction in costs, but may also lead to a situation in which throughput is also reduced.

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**Ethical Challenges**

Reacting to complex and perplexing ethical questions like these can take an unacceptable toll on you, your patients and even the culture of your health care organization. Gain the tools you need to:

- Build ethics into your organization’s culture, especially its policies and procedures
- Manage ethical conflicts at the bedside
- Respond to patients’ refusals of needed medical interventions
- Set ethically justified limits on individual and organizational self-sacrifice and end-of-life care

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A new nurse who assists with the outpatient care came on board and wasn’t familiar with Dr. O. He mostly conducts brief medical interviews, takes blood, and places orders for prescriptions—tasks which take about five minutes per patient.

Since the nurse has spare time, he goes to the reception to collect the medical charts for those patients who completed reception, and he conducts brief interviews one after another. Naturally, patients ended up having to wait until their examination time with Doctor O even though they had finished the interview.

Doctor O began receiving complaints from patients as she guided them into the examination room, “I’ve had to wait over an hour since the initial interview.”

At this, Doctor O suggested to the nurse that maybe it would be better to wait a bit, like before, and bring the patient’s medical charts at the same pace as the patient examinations. In response the nurse said, “But if I do that, then I’ll look like I’m loafing on the job.”

Doctor O asked, “Then if that’s the case, could you help out with pasting the test results onto the patient charts?”

The nurse replied, “Organizing the test results is supposed to be the job of a doctor. Why do nurses have to do the jobs of doctors?”

If behavior is aimed at total optimization, there needs to be appropriate measurements. If there are a large number of inappropriate measurements, then behavior will often be based on old rules and tacit policies. Then, as is often the case, the true constraints will actually be the policies that everyone thought to be reasonable.

These basic principles are not particularly new concepts. However, the fact is that examples similar to this case with Dr. O. are occurring frequently. It could be argued that this shows the difficulty in implementing the principles, or namely the adage “Common sense, but not common practice.”

TOC offers a new way to think about, and hopefully solve, some of the ongoing problems that physician executives have faced for years.

References
