

Research Article

Case Study of the Promotion of Clinical Pathways in the Department of Ophthalmology: Practical Report in a Medical School Hospital

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Abstract

A case study was performed to examine factors associated with the promotion of Clinical Pathways (CPs) in the department of ophthalmology. The relationship between the change in application rate of CPs and the correspondence of doctors with the authority to apply CPs in patients was investigated. Four factors related to promotion of CP use were identified: (i) whether the chairman appreciates the value of CPs in medical treatment and care; (ii) putting a capable doctor in charge of CPs; (iii) implementation of a management policy to promote CPs within a hospital; and (iv) the applicability of CPs to a particular medical department.

Keywords: Electronic clinical pathway; Promotion; Ophthalmology; Application rate; Factor

Abbreviations

CPs: Clinical Pathways; PDT: Photodynamic Therapy; DRG/PPS: Prospective Payment System/Diagnosis Related Group; VEGF: Anti-Vascular Endothelial Growth Factor

Introduction

Clinical Pathways (CPs) as technological process management methods were first applied to medical care by Zander in 1985 [1]. In Japan, CPs were imported from the USA in 1992, and their use was promoted after the establishment of the Japanese Society for Clinical Pathways in 1999 [2]. Although CPs has developed to correspond to Prospective Payment System/Diagnosis Related Group (DRG/PPS) in the USA [3], CPs has been introduced to improve the quality of medical care in Japan [4].

Initially, paper-based CPs was implemented. After the promotion of electronic medical records as a national policy by the Ministry of Health, Labour and Welfare in 2001, electronic CPs has been increasingly used instead of paper-based CPs in Japan. Various functions of electronic medical records for managing and implementing CPs have been developed, almost all of which were included in a package of several electronic medical records products.

However, the functions of paper-based CPs were not always available with electronic CPs, and therefore the shift from paper-based CPs to electronic CPs has not always been easy. As cataract surgery is readily adaptable to CPs, the department of ophthalmology is one department with a high CP application rate. However, CPs was little used at the department of ophthalmology in our hospital during the period of paper-based CPs when orders were mainly used with order entry systems. After the introduction of electronic medical records to our hospital in 2010, CPs was not used at all as they were implemented in electronic medical records. This was because of differences in the environment of medical treatment and

care between university hospitals, such as ours, and general hospitals where electronic CPs were usually used.

Some trials have been carried out to improve CPs over the past 2 years in the department of ophthalmology. This has resulted in an increase in the application rate of CPs from 0% - 10% to more than 30%.

This study was performed to investigate the factors involved in promoting electronic CPs and to explore the solutions peculiar to electronic CPs. Although many studies on CPs have been reported, there have been no previous studies regarding factors involved in promoting CPs in a hospital or increasing the adoption of CPs from the viewpoint of a case study, rather than being based on experience. As there are many differences in the medical care system among countries, a study of CPs in Japan may not be applicable in other countries without modification. However, such studies will contribute to the promotion of CPs even in other countries.

Methods

The present study was performed in the Department of Ophthalmology of Kawasaki Medical School Hospital, Kurashiki, Okayama, Japan. The outline of this hospital is shown in (Table 1). Paper-based CPs were implemented before January 2010, and electronic CPs were introduced along with electronic medical records using EGMAIN-GX (now Ver. 5, originally Ver. 2) as electronic medical records software developed by Fujitsu Ltd. Management of outcomes, tasks, directions to nurses, etc., have been computerized, with the exception of patients' informed consent and CPs for patients.

In this hospital, doctors make out CPs for staff, and a clerk belonging to the CP Committee makes out CPs for patients as supplements. The application of CPs to a patient and evaluation of outcomes are performed by a doctor. CPs implemented between December 2011 and June 2015 was examined.

Table 1: Outline of Kawasaki Medical School Hospital in June 2015.

Number of beds	1182
Number of departments	34
Number of available CPs	313
Average application rate of the hospital	23.1%
Electronic medical records	EGMAIN-GX Ver. 5 (Fujitsu Ltd.)
Data warehouse	Yes
Exclusive staff in charge of CPs	None
Staff developing CPs	Doctors and a clerk belonging to the CP Committee
Formats of implemented CPs	Overview format and daily format
Information systems for implementing CPs	Electronic clinical pathways working on electronic medical records

Table 2: Doctor in charge of CPs.

Period	Initial
Dec 2011 - Mar 2012	Dr. M
Apr 2012 - Mar 2015	Dr. N
Apr 2015 - present	Dr. O

We interviewed some members of the CP Committee regarding the trends of implementing CPs in the whole hospital, and the doctor in charge of CPs in the Department of Ophthalmology regarding the activity of implementing CPs. The number of doctors in the Department of Ophthalmology was obtained from data published by the hospital. The statistics of CPs applied to patients and variances of CPs were obtained from data reported by the CP Committee.

Results

Policy of the hospital to CPs and activity of the department of ophthalmology to CPs

The hospital has implemented a policy requiring all doctors to make out CPs and apply them to patients as far as possible. The annual meeting of the Japanese Society of Clinical Pathways in 2012 was sponsored by this hospital, but had little impact on implementation of CPs in the Department of Ophthalmology.

The hospital management committee held once a month often recommended that the chairman should implement more CPs in departments with little or no CPs. However, the chairman of the Department of Ophthalmology showed little appreciation of the value of CPs in medical treatment and care, and did not recommend his staff to implement CPs aggressively.

However, in early 2014, as the rate of CP application in the

Department of Ophthalmology remained very low, the hospital manager told some members of the Hospital Management Committee that he would place some restrictions on the chairman of the Department of Ophthalmology due to the low rates of CP application. This remark was passed on to the doctors in the Department of Ophthalmology. At this time, the chairman of the Department of Ophthalmology had guidance at a conference in the department regarding use of CPs. Subsequently, the doctor in charge of CPs revised the CPs, and they began to be used by resident doctors.

The CP Committee appoints a doctor in charge of CPs to each medical department, who is the responsible for approval and promotion of CPs. The doctor in charge of CPs recommends other doctors within each department to use CPs at conferences or through oral communication. Three doctors fulfilled the role of doctor in charge of CPs due to changes during the investigation period (Table 2), and two doctors in charge of CPs did not recommend other doctors within the department to use CPs until the chairman of the Department of Ophthalmology issued such guidance in early 2014.

The rates of CP application in each medical department and whole hospital were surveyed by the CP Committee every month. Meetings regarding the implementation of CPs in each medical department have been held once every 3 months, and educational conferences for all hospital staff have been held once a year by the CP Committee. Questionnaire surveys have also been conducted in each medical department to investigate the reasons why CPs was not widely adopted. The CP Committee requested that the Department of Ophthalmology present discussions regarding how doctors dealt with CPs at the meeting for CP implementation held on 29 June in 2015. As preparation for the meeting, the doctor in charge of CPs checked

Table 3: Improvements determined by the doctor in charge of CPs in 2015.

Before	After
Amount of information of CPs for a patient is small. Necessary information is lacking. Small size of characters. Patients could little understand CPs.	Size of characters and amount of information of CPs for patient enlarged.
The doctor printed informed consent documents and CPs for patients. Patient received them separately.	Printing informed consent documents and CPs and handing them over to the patient were performed once in an integrated manner. The doctor provided information regarding CPs to the patient at the time of surgical decision on an outpatient basis.
There were too many documents for the patient to sign. Four kinds of document requiring the patient to sign eight times in total.	Reduced to two kinds of documents requiring a total of four signatures.
When the doctor made CPs for staff on electronic CPs using copy and paste, documents were not copied.	The hospital informed the vendor of this bug.

Table 4: Number of doctors in the department of ophthalmology.

Year	Number of doctors
2011	13
2012	11
2013	13
2014	14
2015	12

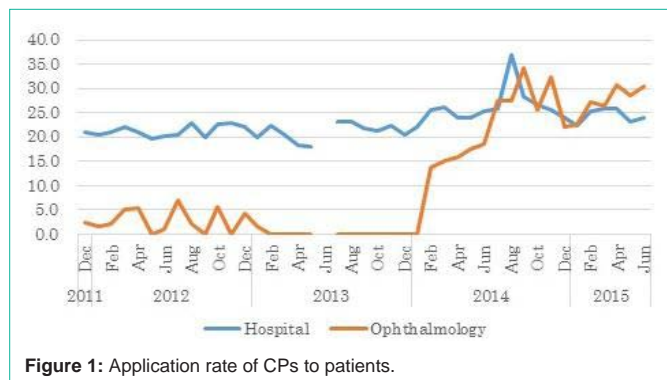


Figure 1: Application rate of CPs to patients.

CPs for patients as well as those for staff. He checked the why there was difficulty in use of CPs in the Department of Ophthalmology and implemented improvements in the CPs (Table 3).

Number of doctors

The number of doctors in the Department of Ophthalmology during the investigation period is shown in (Table 2). The chairman and sub-chairman in the Department of Ophthalmology do not act as physicians in charge of patients. Head doctors sometimes act as the physician in charge of patients, but usually this role is fulfilled by residents. All residents act as physicians in charge of patients. Whether the resident applies CPs to a patient or not is decided only by the resident because senior doctors do not force them to use CPs. Although the number of doctors in the Department of Ophthalmology is different every year (Table 4), there is little variation in the overall number.

Rate of CP application, number of accepted CPs, and statistics of variance

The application rate of CPs during the investigation period is shown in (Figure 1) and (Table 5). It was at most 7.1% before 2012. The CPs used before 2012 were for Photodynamic Therapy (PDT) of age-related macular degeneration and for cataract surgery-during this period, CPs of PDT for age-related macular degeneration had been used by only one head doctor and CPs of cataract surgery had been used by only one doctor in charge of CPs.

However, as treatment for age-related macular degeneration gradually changed from PDT to anti-Vascular Endothelial Growth Factor (VEGF) after 2012 and the doctor in charge of CPs relocated to another hospital in March 2013, the rate of application of CPs to patients dropped to 0% in the Department of Ophthalmology.

However, after 2014, the application rate of CPs increased gradually, and sometimes exceeded 30%, which was higher than the average rate for the whole hospital after 2015. CPs used in this period was for cataract surgery.

Table 5: Application rate of CPs to patients.

Year	Month	Hospital (%)	Ophthalmology (%)
2011	Dec	20.9	2.4
2012	Jan	20.4	1.7
	Feb	21.1	2.2
	Mar	22.0	5.1
	Apr	21.0	5.4
	May	19.6	0
	Jun	20.1	1.1
	Jul	20.6	7.1
	Aug	22.9	2.2
	Sep	19.9	0
	Oct	22.7	5.6
	Nov	23.0	0
	Dec	22.2	4.2
2013	Jun	19.8	1.6
	Feb	22.3	0
	Mar	20.5	0
	Apr	18.3	0
	May	18.1	0
	Jun		lacking
	Jul	23.1	0
	Aug	23.1	0
	Sep	21.8	0
	Oct	21.4	0
	Nov	22.4	0
	Dec	20.6	0
2014	Jun	22.2	0
	Feb	25.5	13.7
	Mar	26.2	15
	Apr	24.1	16
	May	24.0	17.6
	Jun	25.4	18.7
	Jul	25.9	27.4
	Aug	36.9	27.4
	Sep	28.4	34.1
	Oct	26.6	25.5
	Nov	25.7	32.4
	Dec	23.9	22.1
2015	Jun	22.4	22.6
	Feb	25.2	27.3
	Mar	25.9	26.4
	Apr	25.9	30.6
	May	23.1	28.6
	Jun	23.9	30.5

The numbers of CPs permitted by the CP Committee was 12 in December 2011, and were those for cataract surgery, glaucoma, vitreoretinal surgery, and PDT. However, with the exception of CPs

for cataract surgery and PDT, these were not used throughout the investigation period. The number of CPs increased to 26 in June 2015. However, only variations in CPs for cataract surgery increased, and the other new CPs have not been applied to patients.

With regard to variance analysis of CPs, static data were reported at the CP Committee only once in December 2012. There were three variances in CPs of cataract surgery in the Department of Ophthalmology.

Discussion

First key for promotion of CPs

It is obvious that CPs will not be used even if the Hospital Management Committee recommends their use if the chairman of a medical department does not appreciate their value in medical treatment and care. In addition, whether the doctor in charge of CPs in a medical department will prompt staff to apply CPs to patients is dependent on the chairman appreciation of their value.

In this hospital, after the hospital manager instructed the Department of Ophthalmology to use CPs in 2014, the application rate of CPs to patients has been increased suddenly. Therefore, the first key to promotion of CPs is whether the chairman appreciates their value in medical treatment and care. This is because chairmen always have an interest in medical treatment methods that are directly evaluated by patients, but because they do not always have an interest in issues that are not directly evaluated by patients, such as CPs, which are related to the length of hospitalization, risk management, information sharing, and/or staff co-work, etc., in Japan in contrast to the situation in the USA where CPs were introduced for the purpose of medical economy. In Japan, many doctors do not see any benefit to the use of CPs, and the doctor in charge of CPs tends to follow the chairman's opinion. If the value of CPs were also to be related to medical economy in Japan, the conditions around their use would be different and hospital policies would spread among the staff.

Second key for promotion of CPs

After 2014, two doctors in charge of CPs could not help promoting CPs in the Department of Ophthalmology. However, the correspondence to CPs between the doctor in charge of CPs before March 2015 and after April 2015 was different. The former doctor increased the application rate by using previous CPs that were difficult to use, while the latter doctor examined the reasons for any difficulties in their use and improved the CPs accordingly. This difference may have been related to the two doctors' abilities or activities to promote CPs. Both doctors achieved similar CP application rates, but the possibility of future expansion was completely different between them. It should be possible to some extent to predict how the doctor in charge of CPs will affect CP use before selecting them for the position. Therefore, the second key to promotion of CP use is the careful selection of the doctor in charge of CPs.

Third key for promotion of CPs

If the aggressive promotion of CPs is not included in the hospital management policy, promotion of CPs in medical departments where staff does not appreciate their value may be difficult. The management policy of this hospital involved aggressive promotion of CPs as indicated by the sponsoring of the annual meeting of the

Japanese Society of Clinical Pathways in 2012. The management policy markedly influences the promotion of CPs. Therefore, the third key to promotion of CPs is to adopt a management policy of aggressive promotion of CPs in the hospital.

Fourth key for promotion of CPs

It is difficult to develop CPs in some medical departments, such as psychiatry or neonatology where the patients' conditions can easily change and are unpredictable. In contrast, CPs can be developed easily in the Department of Ophthalmology where cataract surgery is performed due to the predictable nature of both hospitalization schedule and stability of patients' clinical condition after the operation [4]. Indeed, the application rate of CPs remains at 0% at present in the departments of psychiatry and neonatology of our hospital. Therefore, the fourth key to promotion of CPs is their applicability to a particular medical department.

Organizational development stage

A trial to apply the CMMI-DEV [5], which is an index for measuring the organizational maturation of software development, to the organizational development of a medical and care team for bedsores has been performed recently [6]. If CMMI-DEV can be applied to CPs from the viewpoint of a medical and care team, the organizational maturity level of the Department of Ophthalmology in this hospital will be as follows: As level 1 indicates disorder, it ended when the hospital manager began to take leadership of promoting CPs in the Department of Ophthalmology instead of the chairman in early 2014. As level 2 represents management, it began when CPs had been promoted. As level 3 indicates standard process, it will start when variances are gathered and analyzed. As level 4 is quantitative management, it will start when CPs are improved by variance analysis. As level 5 indicates optimization, it will start when CPs will become average domestically by benchmarking. It seems that efforts by not only each department but by the whole hospital will be necessary for the Department of Ophthalmology to reach a higher stage.

Conclusion

The keys to promote CPs are as follows: (i) whether the chairman appreciates their value in medical treatment and care; (ii) putting a capable doctor in charge of CPs; (iii) implementation of a management policy to promote CPs within a hospital; and (iv) the applicability of CPs to a particular medical department.

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