2.3. *Data*

We analyzed five different variables gathered from four different data sources. Medical service fees were calculated based on published current fee schedules. The operation time was obtained from database gathered by the Voluntary Hospitals of Japan, Quality Indicator Project (VHJ-QIP) [5]. The VHJ-QIP database includes administrative data from eleven private and teaching hospitals in Japan. The number of attending staff and the level of technical difficulty were obtained from research data [3, 4] provided by the GAIHOREN. Here the level of technical difficulty was represented by the number of years of experience required on the part of the main surgeon. Facility and equipment costs, and partial material costs were based on two main data sources: 1) research data [4] provided by the GAIHOREN; 2) research data [6] provided by the Institute for Health Economics and Policy (IHEP), in which the average costs of the 5 most frequent surgeries in Japan were calculated. Partial material costs were also gathered during the course of original research conducted for this study. These data sources were adopted for the following reasons: 1) All the data are actual data about Japanese acute term care, which is suitable for our study; 2) The data are obtained from surveys of multiple facilities or panels of all-Japan surgical associations, or nationally used official data, to avoid biased distribution as far as possible. Table 2 provides a summary of the data used. Here it was assumed that the exchange rate was 110 yen per U.S. dollar.

2.4. Exclusion criteria

We excluded the following VHJ-QIP data from analysis: 1) cases where the patient was younger than 3 years of age, because the surgical fee reimbursement is significantly different from adults; and 2) cases with multiple, co-incident surgical procedures, because it was impossible to determine the operation time for the study surgery.

2.5. Statistical analysis

We performed the following analyses: 1) In order to examine a variation in the hourly values allocated to physician activity, we calculated quartiles about hourly values per surgical team or surgeon among types of surgery, by using the actual data; 2) In order to examine the association between the hourly values and the operation time or the level of technical difficulty, we drew scatter plots and reported regression coefficients (X: the operation time or the level of technical difficulty, Y: the hourly values). All analytical

procedures were performed using the SPSS statistical package Version 11.0. (SPSS Inc., Chicago, IL)

As mentioned above, because it is uncertain how facility and equipment costs should be estimated, we used three kinds of facility and equipment costs in calculating the hourly values for physician activity: 1) Facility and equipment costs are zero (case 0); 2) Facility and equipment costs are data estimated by GAIHOREN (case 1); and 3) Facility and equipment costs are data estimated by IHEP (case 2).

1) Case 0

These calculations involved two steps. First, we subtracted only large material costs from medical service fees, in order to estimate the physician work portion of the total fee. Second, we divided this remaining value both by surgical team operation hours, and by operation man-hours. For these calculations we counted non-doctor medical staff as half of a doctor. Therefore, the hourly values were calculated as follows:

Hourly values = (Medical fee – Large material costs)/Operation-related time.

2) Case 1

These calculations also involved two steps. In the first step, however, we subtracted both large material costs and facility and equipment costs from the medical service fee. Here facility and equipment costs were obtained from data estimated by GAIHOREN. Therefore, hourly values were calculated as follows:

Hourly values = (Medical fee – Large material costs – Facility and equipment costs)/Operation-related time.

3) Case 2

These calculations were performed by the same method as case 1 although the facility and equipment costs were different. Here facility and equipment costs were based on data estimated by IHEP. Therefore, the hourly values were calculated as follows:

Hourly values = (Medical fee – Large material costs – Facility and equipment costs)/Operation-related time.

3. Results

Table 3 shows the characteristics of the study cases, such as age and actual operation time (before the 30 percent increase), drawn from VHJ-QIP data. As this table shows, there was a wide variation in age and operation time. Operation time was particularly variable: the median was less than 10 minutes while the maximum was more than 6 hours.

Table 4 shows the hourly values allocated to physician activity, by surgical team and

by surgeon. The hourly values allocated to physician activity were low (61.0 dollars and 121.5 dollars per a surgeon: means of case 1 and case 2 estimations). There were wide disparities in hourly values among types of surgery (from -28 to 237 dollars and from 6 to 328 dollars: ranges in the case 1 and case 2 estimations). No difference was observed among types of surgery in the trend of hourly values when calculated by the three types of data although the figures varied. In short, what was evaluated as high using one data was also high using other data, similar to low hourly values. In some cases, material costs, and facility and equipment costs exceed the surgical fee and physician activity fee would be less than zero.

Figure 1 shows the association between the operation time and physicians' hourly values on both per surgical team and per surgeon. The medians of case 1 and case 2 for each surgery are expressed for the points, and the two points are connected in a straight line. No significant linear relationship was detected, but a U-shape relationship was found with its lowest value at around 200 minutes. For cases with less than 200 minutes of operation time, a significant linear relationship was detected (Figure 1-2: Regression coefficient = -0.45, $p < 0.05$).

Figure 2 illustrates the association between the level of technical difficulty and the hourly value, per surgical team and per surgeon. The medians of case 1 and case 2 for each surgery are expressed with the points, and the two points are connected in a straight line. There was a trend that the hourly values varied in proportion to the level of technical difficulty, but no significant linear relationship was detected (Figure 2-2: Regression coefficient = 7.97, $p = 0.053$). A wide range in hourly values was observed between procedures with a similar level of technical difficulty. The range was especially wide at the difficulty level which requires ten or more years of surgeon's experience (Figure 2-2: from -28 to 176 dollars and from -5 to 223 dollars: ranges in the level of difficulty which requires ten years and twelve years of surgeon's experience).

4. Discussion

In this study, we examined the current surgical payment system in Japan by clarifying the hourly values allocated to physician activity. The results of our analysis suggest that: 1) wide disparities in hourly values exist among types of surgery; 2) when long surgeries were excluded, shorter surgeries tended to have higher hourly values; 3) the association between the hourly values and the difficulty level was less clear and their variation was large even at the same difficulty level; 4) in some cases, material costs, and facility and equipment costs exceed the surgical fee, resulting in a physician activity fee of less than zero. These

results may be understood considering the characteristics of the Japanese healthcare system that some studies [7,8] have indicated: 1) prices are set to achieve overall balance of the national healthcare budget resulting in efficient cost control; 2) fees for professional work tend to be low in comparison to fees for materials and equipment; 3) the scope of the surgical fee is not clear and some surgical fees include expensive material costs. In the association between the hourly values and the operation time, we are reluctant to draw the conclusion that prices are consistent independent of the length of operation time. This is shown as the hourly values of shorter surgeries are relatively higher than those of longer surgeries when the long surgeries are excluded. In the association between the hourly values and the level of technical difficulty, it seems logical that staff costs should be proportional to time, staff numbers and the unit price that takes the level of technical difficulty into account. However, in spite of a similar level of technical difficulty, there were wide variations in hourly values.

In this study we assumed that surgical fees included staff costs, partial material costs, and facility and equipment costs. These assumptions are similar to the GAIHOREN report (4^{th} edition) [4], which assumed that surgical fees corresponded to staff costs, other costs (e.g. material costs, facility and equipment costs, overhead costs etc.), and tax expenses and profits. In the 5^{th} edition [3] of the GAIHOREN report, however, reimbursement levels were based entirely on staff costs. As previously mentioned, the current system for the reimbursement of surgical fees in Japan is extremely vague, providing only total prices, adjusted to cover costs for each surgery with no explanation of component costs. On the other hand, in the US, physician fees are reimbursed according to a resource-based relative value scale (RBRVS) [9-15]. The US system has been widely accepted as a rational and systematic approach to measure the resource costs associated with physician services. The major components of this scale are physician work, the practice cost and professional liability insurance. The physician work component represents time, technical skill and physical effort, mental effort and judgment, and psychological stress. Although the Japanese payment system cannot be easily compared with the US system, the approach used in developing the RBRVS may be a favorable choice. However, there are potential flaws in the RBRVS to reward long and difficult procedures for a given condition more than simpler solutions. The viewpoint of effectiveness or appropriateness of any particular therapeutic approach is hardly built in the RBRVS. Ideally, treatments that are more effective should be more rewarding for those who practice them than treatment that are less effective.

With regard to rationalizing surgical payments in Japan, we believe that a rational payment system is one whose components are clear and balance their costs. The surgical fee

should include staff activity, practice costs and other costs (Table5). For staff activity, while time and the number of attending staff are objective measurements, technical difficulty is not. The problem with the technical difficulty of the procedure is cross-specialty linkage. This problem is complex, and also in RBRVS, some studies [16-19] focusing on appropriate values and methodology have been performed. The problem of technical difficulty regarding the patient's condition requires an adjustment by patient or patient group. However, the difference among patients is thought to be mainly reflected by time because the higher the technical difficulty, the longer the surgery. Thus this problem can be solved by categorizing patients based on operation time. Practice costs involve the components of facility, medical equipment, and materials. However, this method of pricing is challenging because there is a wide variation in costs among types of surgery and institutions.

Other costs involve service department costs, malpractice-related costs, and quality costs. Although malpractice-related costs and quality costs did not previously occupy a significant portion of costs, they have recently become an important concern involving soaring costs [20]. Thus they are vital components. Moreover, a geographic adjustment factor should be considered, although one has not been adopted yet in Japan. Finally, we need to consider payment for performance and profit to offer an incentive to improve quality. In some countries, there are several quality incentives programs with rewards. [21, 22] With that, if we compile the above mentioned components, such as cost and adjustment, it can be represented as Table 5. Moreover, although this framework is a proposal about surgical fee, it can be applicable for non-surgical.

Some limitations must be considered when we interpret the results of our study. First, our study calculated the hourly values using general facility and equipment costs adjusted by the level of technical difficulty or not adjusted. However, facility and equipment costs differ between procedures with the same level of technical difficulty, and more properly, may in fact vary with each surgery and each institution. Thus we used several different data sources to calculate the hourly values as precisely as possible. As mentioned above, the tendencies of these figures (case 1 and case 2) were relatively similar so they may be used to interpret the true value. Also, because it is impossible to accurately estimate costs to suit each situation, the calculation method proposed in this study would be reasonable.

Second, material costs also pose a problem. In this study, we subtracted the intraocular lens cost from a procedure that combined intraocular lens insertion with cataract removal, and we subtracted the cost of disposable trocars from laparoscopic cholecystectomy. For our calculation, we estimated about 450 dollars for intraocular lenses and about 550

dollars for disposable trocars. However, the price of intraocular lenses varies widely with the choice of material, route of purchase, and supplier. For this reason, we set an average price by interviewing hospitals, a dealer, and the Japan Intraocular Lens Association. Our estimated average price is similar to the 470 dollar price investigated [23] by the IHEP in 1997. As for disposable trocars, we referred to the prices estimated by GAIHOREN. Although they are expensive, these two materials are essential to the procedures mentioned. Often however, there are many materials that cannot be charged separately. According to unpublished research data from some hospitals in Japan, un-chargeable material costs account for more than 20 percent of medical fees for cardiac surgery. However, it would be difficult to calculate all of these costs for the same reasons that it is difficult to calculate facility and equipment costs.

5. Conclusions and Policy implications

The Japanese government has undertaken a review of the reimbursement system in an effort to determine the factors that drive hospital and physician fees, with the stated goal of rationalizing fees with the difficulty level, the time, and the technical capability. However, the relevant concepts and methodology are not well developed yet. Thus we examined these issues carefully by using a cost accounting scheme and actual data.

In conclusion, the hourly values allocated to physician activity were set low in the study surgeries. Moreover, the hourly values for physician activity vary widely among the types of surgery, and do not appropriately reflect the difficulty level of each surgery. This may be due to the lack of clarity in the scope and the pricing mechanism of surgical and physician activity fees.

In order to develop an appropriate payment system, the following actions are proposed. First, the scope of the surgical fee should be made clear and comprehensive, including physician activity, practice costs and overhead costs. Moreover the components of quality costs and malpractice-related costs should be considered. Second, the mechanism used to calculate the physician activity fee should be modeled to reflect the manpower volume and the level of technical difficulty appropriate to each surgical procedure. Third, a methodology for translating cost information into price should be developed. In the process, adjustments for geography, payment for performance, etc. should be considered. Therefore, first of all, it is essential to perform empirical research to organize the components, identify the challenges associated with surgical payment, and develop a costing methodology. Although a model for patient-level costing has been developed recently [24] with heavy emphasis on cost-based

pricing, we are aware of few published reports that use actual data to review surgical payments. We hope this study is timely and helps to motivate further research towards a rational surgical payment system for Japan.

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Tab1. Considerable components included in current surgical payment

Staff costs		
	Surgeon	×
	Nurse	×
	Co-medical	×
Material costs		
	Drugs	○
	Medical materials	○
	Disposable supplies	×
Facility and equipment costs		
	Overhead (Utility costs, Maintenance costs, etc.)	×
	Depreciation	×

Note: 1. The components marked with the round mark are separately chargeable.
2. Some materials are not separately chargeable.
3. The costs regarding anesthesia are not listed because of separate claim.

Tab2.Summary of the data used for this analysis

Surgery		Surgical fees (yen) **	Large material cost (yen)	Facility and equipment costs (yen/hr)		Number
				case 1	case 2	Surgeons
Open reduction of fracture (scapula, brachial, thigh)		128,000	0	68,494	37,897	3
Arthroplasty with prosthetic replacement (shoulder, groin, knee)		156,000	0	77,834	37,897	3
Intraocular lens insertion with cataract removal *	(high difficulty)	120,650	50,000	129,983	37,897	3
	(low difficulty)	120,650	50,000	82,738	37,897	3
Tonsillectomy		33,000	0	49,035	37,897	2
Removal of lung cancer (lobectomy)*	(high difficulty)	311,000	0	101,184	37,897	3
	(low difficulty)	311,000	0	77,834	37,897	3
Coronary-artery bypass graft surgery (two or more grafts)		854,000	0	113,482	37,897	4
Repair of inguinal hernia		61,600	0	49,035	37,897	2
Cholecystectomy		152,000	0	73,164	37,897	3
Laparoscopic cholecystectomy		224,000	60,000	73,164	37,897	3
Appendectomy		64,200	0	56,040	37,897	2
Colostomy		65,900	0	49,035	37,897	2
Excision of hemorrhoids		53,600	0	40,474	37,897	2
Transurethral resection of prostate		171,000	0	75,499	37,897	2
Total hysterectomy		176,000	0	73,164	37,897	3
Cesarean section (emergency)		178,000	0	75,499	37,897	3
Cerclage of cervix (Shirodkar, Lash)		30,900	0	56,040	37,897	2
Abortion (less than 11 weeks of gestation)		19,100	0	49,035	37,897	1

* : Japanese College of Surgeons present the different facility and equipment costs (4th edition)
**: The surgical fees of cataract removal were calculated assuming a case of an ultrasonic extraction way

Tab3. Characteristics of the study cases

Surgery	N	Age Average (Standard deviation)	Operation time (minutes) Median (first quartile, third quartile)
Open reduction of fracture (scapula, brachial, thigh)	776	65.1 (24.6)	79 (56, 116)
Arthroplasty with prosthetic replacement (shoulder, groin, knee)	216	75.0 (11.0)	130 (110, 152)
Intraocular lens insertion with cataract removal	299	72.5 (10.8)	22 (17, 30)
Tonsillectomy	279	19.0 (11.6)	48 (35, 65)
Removal of lung cancer (lobectomy)	529	63.7 (11.5)	190 (150, 233)
Coronary-artery bypass graft surgery (two or more grafts)	1277	65.5 (9.5)	360 (305, 425)
Repair of inguinal hernia	1797	48.4 (28.1)	45 (34, 60)
Cholecystectomy	711	63.7 (13.3)	102 (77, 139)
Laparoscopic cholecystectomy	971	53.0 (14.0)	85 (65, 110)
Appendectomy	1074	31.0 (20.6)	49 (36, 64)
Colostomy	129	67.8 (14.7)	68 (44, 95)
Excision of hemorrhoids	341	54.6 (15.7)	25 (15, 35)
Transurethral resection of prostate	874	72.6 (7.5)	59 (40, 83)
Total hysterectomy	699	49.0 (9.8)	95 (73, 125)
Cesarean section (emergency)	135	29.6 (5.5)	60 (50, 75)
Cerclage of cervix (Shirodkar, Lash)	111	30.5 (4.7)	20 (17, 28)
Abortion (less than 11 weeks of gestation)	790	29.4 (7.0)	6 (5, 9)

Tab4. Hourly values for physician activity

Surgery	N	Hourly values per surgical team			Hourly values per surgical staff			Note	
		Median	1st quartile	3rd quartile	Median	1st quartile	3rd quartile		
Open reduction of fracture (scapula, brachial, thigh)	776	70,455	50,600	89,298	17,611	12,650	22,319	Case 0	
		20,823	−2,079	44,693	5,203	−517	11,165	Case 1	
		42,988	21,450	64,625	10,747	5,368	16,148	Case 2	
Arthroplasty with prosthetic replacement (shoulder, groin, knee)	216	55,374	47,366	65,450	13,838	11,836	16,357	Case 0	
		−4,477	−12,496	5,577	−1,111	−3,124	1,386	Case 1	
		26,224	18,216	36,300	6,556	4,554	9,075	Case 2	
Intraocular lens insertion with cataract removal	299	81,510	70,642	90,189	20,372	17,655	22,539	Case 0	
		26,521	5,654	43,175	6,622	1,408	10,791	Case 1	(high difficulty)
		46,508	29,271	60,258	11,627	7,315	15,059	Case 1	(low difficulty)
		65,483	51,700	76,483	16,368	12,925	19,118	Case 2	
Tonsillectomy	279	25,377	20,834	30,459	8,459	6,941	10,153	Case 0	
		−4,765	−12,705	4,048	−1,595	−4,235	1,342	Case 1	
		2,057	−5,093	10,054	682	−1,694	3,344	Case 2	
Removal of lung cancer (lobectomy)	529	75,537	61,600	95,689	18,876	15,400	23,914	Case 0	
		−2,277	−16,225	17,853	−561	4,048	4,455	Case 1	(high difficulty)
		15,664	1,727	35,816	3,916	429	8,954	Case 1	(low difficulty)
		46,387	32,450	66,539	11,594	8,107	16,632	Case 2	
Coronary-artery bypass graft surgery (two or more grafts)	1277	109,483	94,017	129,228	18,238	15,664	21,538	Case 0	
		22,187	5,522	41,932	3,696	913	6,985	Case 1	
		80,333	64,460	100,078	13,387	10,736	16,676	Case 2	
Repair of inguinal hernia	1797	49,280	41,063	57,750	16,423	13,684	19,250	Case 0	
		19,855	8,371	31,691	6,611	2,783	10,560	Case 1	
		26,532	15,796	37,609	8,844	5,258	12,529	Case 2	
Cholecystectomy	711	68,772	50,468	85,228	17,193	12,617	21,307	Case 0	
		12,496	−5,808	32,582	3,124	−1,452	8,140	Case 1	
		39,622	21,318	57,959	9,900	5,324	14,487	Case 2	
Laparoscopic cholecystectomy	971	85,558	68,805	103,576	21,384	17,193	25,894	Case 0	
		31,482	12,529	53,515	7,865	3,124	13,376	Case 1	
		57,552	39,655	77,649	14,388	9,911	19,404	Case 2	
Appendectomy	1074	48,752	40,975	58,355	16,247	13,651	19,448	Case 0	
		13,992	2,816	27,786	4,664	935	9,262	Case 1	
		25,245	15,169	37,686	8,415	5,049	12,562	Case 2	
Colostomy	129	40,337	31,625	53,075	13,442	10,538	17,688	Case 0	
		6,314	−5,632	23,782	2,101	−1,870	7,920	Case 1	
		14,047	2,827	30,437	4,675	935	10,142	Case 2	
Excision of hemorrhoids	341	58,465	49,467	71,456	19,481	16,489	23,815	Case 0	
		40,073	27,676	57,970	13,354	9,218	19,316	Case 1	
		41,239	29,062	58,828	13,739	9,680	19,602	Case 2	
Transurethral resection of prostate	874	115,280	90,794	146,564	46,112	36,311	58,619	Case 0	
		65,230	35,332	103,422	26,092	14,135	41,371	Case 1	
		90,156	62,953	124,905	36,058	25,179	49,962	Case 2	
Total hysterectomy	699	84,480	64,977	102,520	21,120	16,236	25,630	Case 0	
		28,875	8,701	50,666	7,216	2,167	12,661	Case 1	
		55,671	35,827	75,658	13,915	8,954	18,909	Case 2	
Cesarean section (emergency)	135	118,657	101,706	133,496	29,656	25,421	33,374	Case 0	
		68,332	47,784	86,306	17,083	11,946	21,571	Case 1	
		93,401	74,635	109,813	23,342	18,656	27,445	Case 2	
Cerclage of cervix (Shirodkar, Lash)	111	37,070	31,955	39,446	12,353	10,648	13,145	Case 0	
		14,663	4,906	19,173	4,884	1,628	6,391	Case 1	
		21,912	23,562	25,729	7,304	4,554	8,569	Case 2	
Abortion (less than 11 weeks of gestation)	790	31,823	29,381	32,736	15,906	14,685	16,368	Case 0	
		23,650	18,062	25,729	11,825	9,031	12,859	Case 1	
		25,509	20,636	27,324	12,749	10,318	13,662	Case 2	

Tab5. Important components included in surgical payment

Staff activity
Time
Number of attending staff
Technical difficulty of procedure
Technical difficulty by patient's condition
Practice costs
Facility
Medical equipment
Materials
Other costs
Malpractice related costs (including professional liability)
Quality (patient safety, infection control)
Service department
Loss of income (copayment default)
Payment for performance
Profit (investment to growth)
Geographic adjustment

Fig1-1. The association between operation time and hourly values for physician activity per surgical team

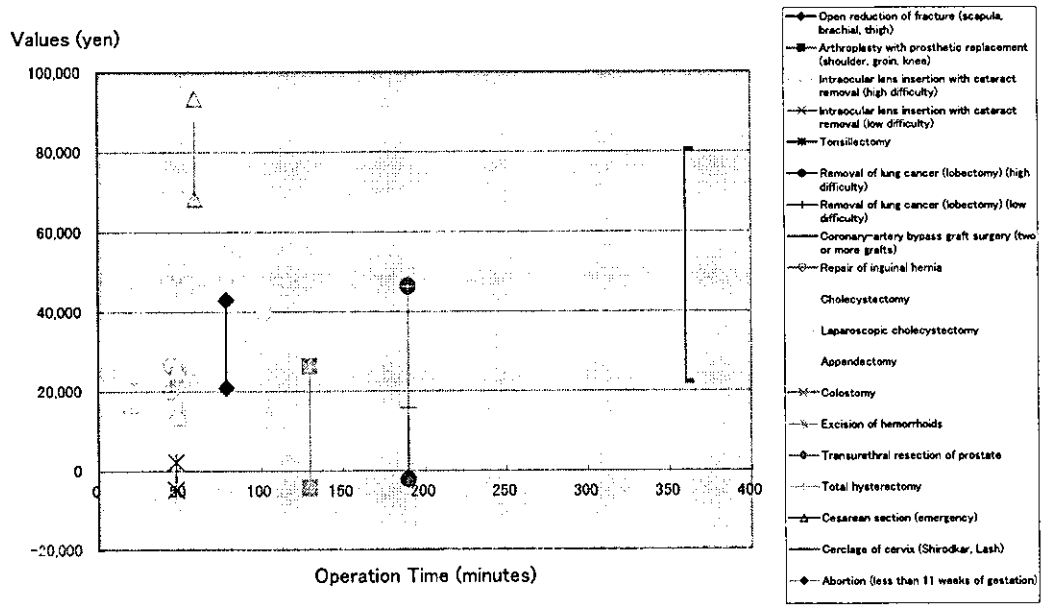


Fig1-2. The association between operation time and hourly values for physician activity per surgical staff

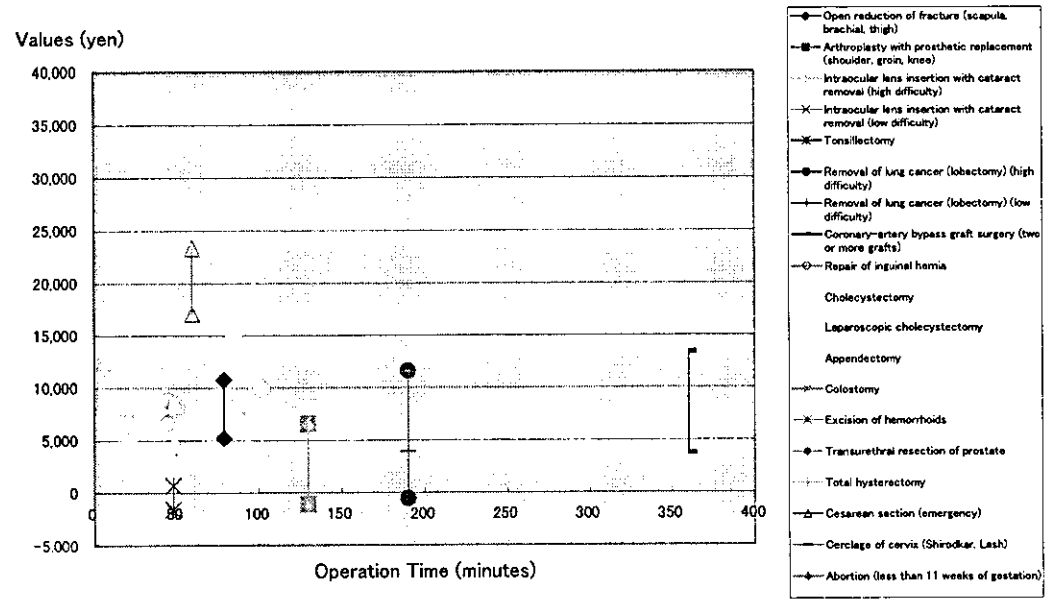


Fig2-1. The association between difficulty level and hourly values for physician activity per surgical team

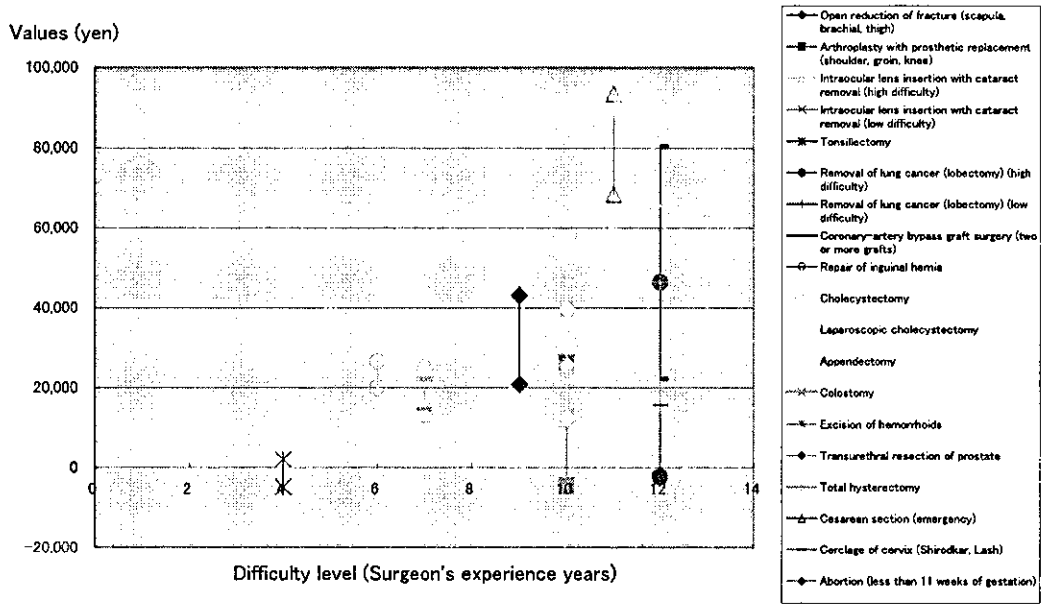
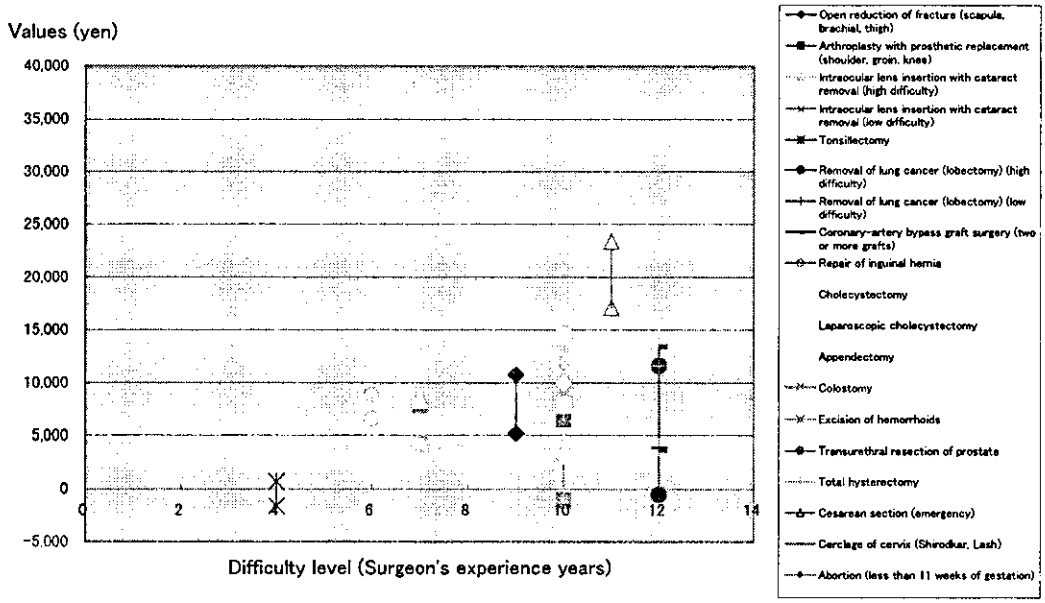


Fig2-2. The association between difficulty level and hourly values for physician activity per surgical staff



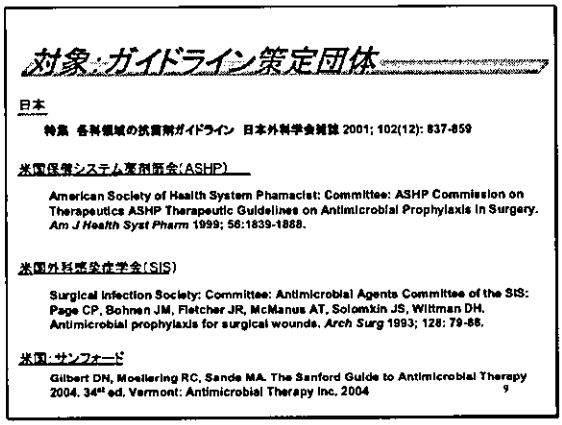
Ⅳ．周術期の予防的抗生剤投与
—（１）周術期の抗生剤使用に関する国内外のガイドライン

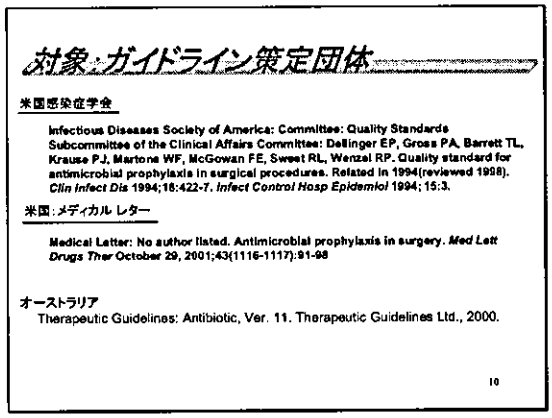
【目的】

抗生剤の適切な使用は、重要な病院感染対策であるが、日本における抗生剤使用量は欧米と比較して多いといわれる。周術期の予防的抗生剤投与法に関する国内外のガイドラインをレビューし、推奨されている投与法を比較検討する。

【方法】

国外から、米国保健システム薬剤師会（ASHP）・米国外科感染症学会（SIS）・サンフォード・米国感染症学会・メディカル レター、オーストラリア治療ガイドライン、国内からは日本外科学会に掲載された各診療科向けの抗生剤使用ガイドラインを検討した。

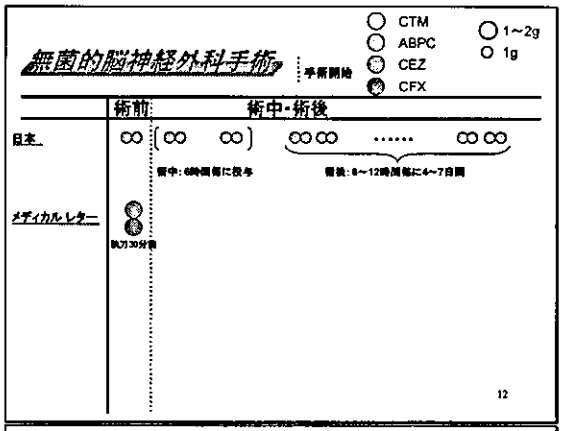


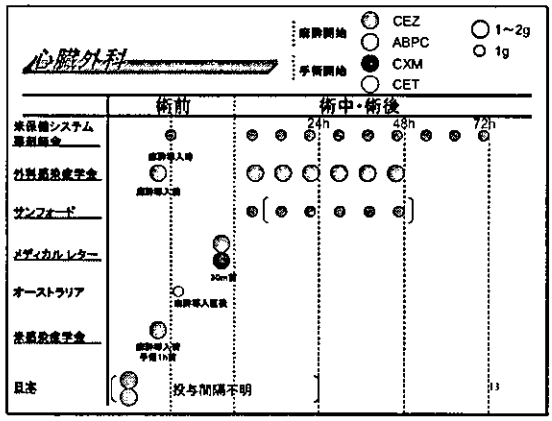


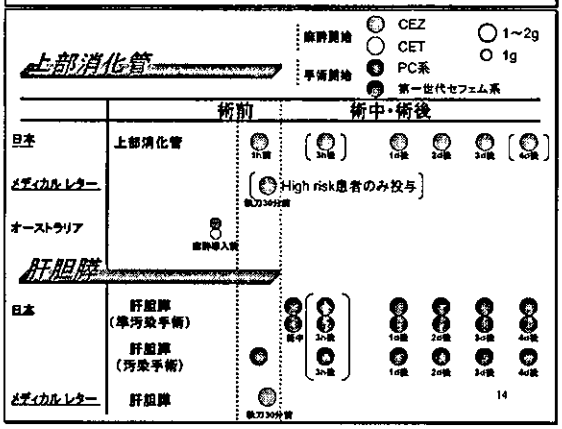
【結果】

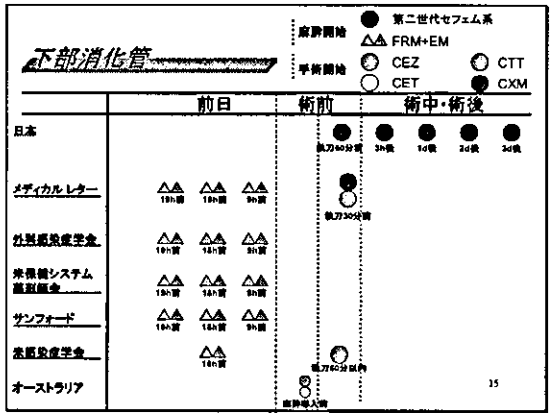
各標準的な手術における予防的抗生剤投与法を示す。

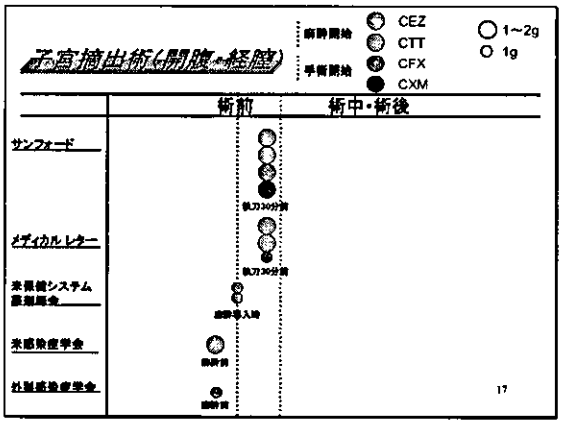
具体的な抗生剤の投与法が示されている日本のガイドラインは、消化器外科や無菌的脳神経外科手術などごく一部であった。また具体的な投与法が示されている場合でも、投与期間は欧米のガイドラインと比較して長かった。欧米でも術式によっては、投与法がガイドラインにより若干異なった。

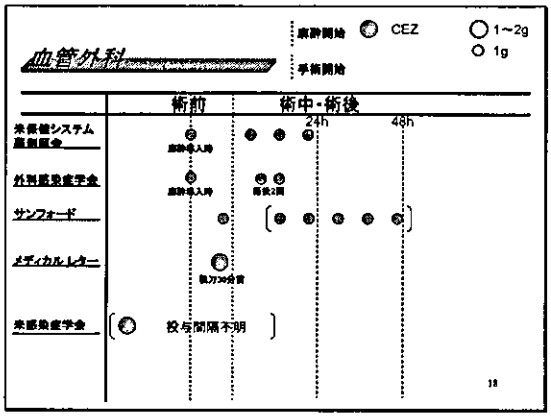

無菌的脳神経外科手術
CTM
ABPC
CEZ
CFX
1~2g
1g
手術開始
術前
術中・術後
日本
メディカル レター
術中：6時間毎に投与
術後：8～12時間毎に4～7日間
執刀30分前
12

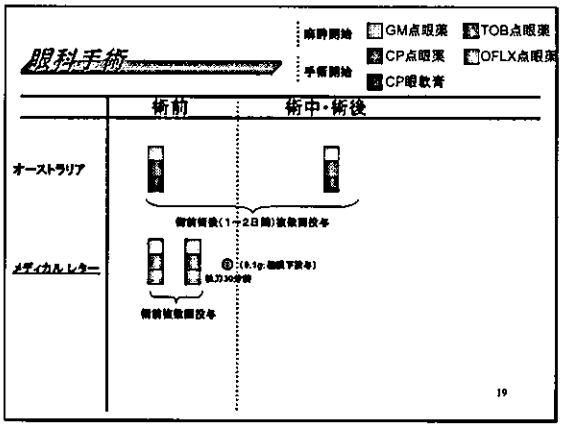

心臓外科
麻酔開始
手術開始
CEZ
ABPC
CXM
CET
1~2g
1g
術前
術中・術後
24h
48h
72h
米保健システム
外科感染症学会
サンフォード
メディカル レター
オーストラリア
日本
麻酔導入時
30m前
麻酔導入後
執刀30分前
投与間隔不明
13

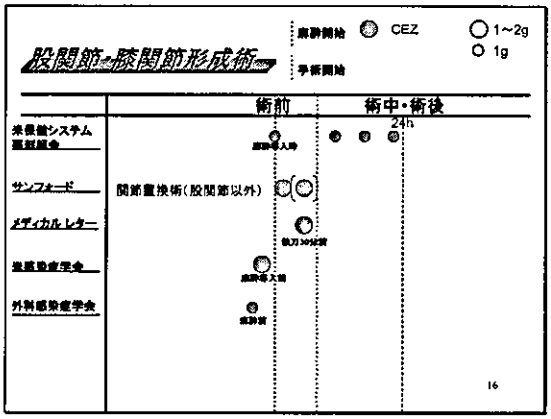

上部消化管
麻酔開始
手術開始
CEZ
CET
PC系
第一世代セフェム系
1~2g
1g
術前
術中・術後
日本
メディカル レター
オーストラリア
上部消化管
High risk患者のみ投与
執刀30分前
麻酔導入後
肝胆膵
肝胆膵
(準汚染手術)
肝胆膵
(汚染手術)
14


下部消化管
麻酔開始
手術開始
第二世代セフェム系
FRM+EM
CEZ
CET
CTT
CXM
前日
術前
術中・術後
日本
メディカル レター
外科感染症学会
米保健システム
サンフォード
米感染症学会
オーストラリア
執刀60分前
執刀30分前
麻酔導入時
15


子宮摘出術(開腹・経腟)
麻酔開始
手術開始
CEZ
CTT
CFX
CXM
1~2g
1g
術前
術中・術後
サンフォード
メディカル レター
米保健システム
米感染症学会
外科感染症学会
執刀30分前
麻酔導入時
麻酔前
17


血管外科
麻酔開始
手術開始
CEZ
1~2g
1g
術前
術中・術後
24h
48h
米保健システム
外科感染症学会
サンフォード
メディカル レター
米感染症学会
麻酔導入時
術後2回
執刀30分前
投与間隔不明
18


眼科手術
麻酔開始
手術開始
GM点眼薬
CP点眼薬
CP眼軟膏
TOB点眼薬
OFLX点眼薬
術前
術中・術後
オーストラリア
メディカル レター
術前術後(1～2日間)抜糸時投与
執刀30分前
術前抜糸時投与
19


股関節・膝関節形成術
麻酔開始
手術開始
CEZ
1~2g
1g
術前
術中・術後
24h
米保健システム
サンフォード
メディカル レター
米感染症学会
外科感染症学会
関節置換術(股関節以外)
執刀30分前
麻酔導入時
麻酔前
16

【考察】

欧米のガイドラインは、主に臨床試験の結果を基にして作られている。したがって、殆どの清潔・準清潔手術で術前の単回投与が推奨されている。それに対して日本のガイドラインでは、現状に配慮しているためか、欧米のガイドラインの推奨と比較して、かなり長い投与期間が推奨されている。また具体的な投与法の推奨がない術式も多い。日本において抗生剤の適正使用を促進するには、エビデンスに基づいた抗生剤使用法に対する理解とコンセンサスを臨床医より得る必要ある。