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REVIEW ARTICLE

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## COSTS OF UNILATERAL INGUINAL HERNIOPLASTY OPERATION IN A TEACHING HOSPITAL: PRICES ANALYSIS OF THE UNIQUE HEALTH SYSTEM AND HEALTH PLANS OPERATORS

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### ABSTRACT

**Introduction:** University hospitals or not, are constantly making criticisms regarding the low values offered by the Unified Health System (UHS). Health Plan Operators (HPO) can be one of the alternatives to help the sustainability of these hospitals. **Objectives:** To present the hospital costs of inguinal hernioplasty surgery and compare them with UHS and HPO prices to find out if they were sufficient with the costs, if it had differences between them and which were more profitable. **Method:** This research was descriptive retrospective and consisted of a case study carried out in 2018 in a teaching hospital, philanthropic and non-profit in the State of São Paulo. **Results:** UHS costs were R\$ 1.256,60 and HPO costs were R\$ 1.292,69. Respectively, the prices paid were R\$ 547,51 and R\$ 3.405,73. **Conclusion:** HPO costs were higher (2.8%) than UHS costs. On the other hand, the average price predicted by the HPO proved to be (622%) higher than that of UHS.

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### INTRODUCTION

The different health entities, such as university hospitals or not, medical councils, medical and hospital associations, as well as other diverse media, are constantly making public criticisms regarding the low values offered by the Unified Health System (UHS) referring to payments for hospital medical procedures. In part, due to these low values, federal, state, municipal, philanthropic, teaching and non-profit hospitals across Brazil are daily facing the risk of having their beds deactivated and their debts constantly increased throughout the country (ABRAHUE, 2017). The UHS Table of Procedures, Medicines, and Health Plan Operators (HPO) is a reference for the payment of more than seven thousand procedures performed in these institutions and, with the evolution of medicine, new procedures and new technologies have been rapidly incorporated (SIGTAP, 2019). In this way, health sector costs have increased considerably, while the prices passed on by UHS to hospitals have had a little variation, related to the increase in payments. Teaching Hospitals to have a fundamental role in the Health System, as

they have the mission of training human resources, building knowledge through scientific research, developing and testing new technologies and attending to highly complex cases (LAPREGA, 2015). HPO can be one of the alternatives to help the sustainability of philanthropic hospitals. Since Law n° 12.101/2009 that regulates these hospitals allows the provision of a service provider with a minimum percentage of 60% of care UHS to guarantee philanthropy certification (SIGTAP, 2019) and the remaining 40% could be direct to meet the demand offered by HPO of health plans or by private patients. In Brazil, according to Law n° 12.101/2009, in 2018, about 1.373 hospital institutions had the Social Assistance Beneficent Entity Certification (MINISTÉRIO DA SAÚDE, 2019), for exemption from social contributions. Currently, the hospital that is part of this study also has SABEC and part of its obligations and information are treated the same as the issues of health institutions, with the same legal personality, whether private or philanthropic and non-profit. However, they have hired by public managers to provide services to UHS. The focus of our research is on inguinal hernia, which is one of the most common surgical diseases worldwide. The open treatment for correction of this entity with the application of

polypropylene mesh significantly reduces recurrences. Also, the inguinal hernioplasty operation is among the most performed in general and digestive surgery services in the world. The application of polypropylene mesh, a technique proposed by Lichtenstein et al (1989), has been one of the most used procedures in the correction of inguinal hernias. Due to its efficiency, it is one of the first taught to younger surgeons. Teaching centers, colleges, and universities very often adopt this operative technique for its effectiveness.

In 2018, according to information obtained from the database of the UHS Informatics Department called DATA-UHS, Brazil approved 120.342 Hospitalization Authorization Guides (HAG) for the performance of surgical procedures for unilateral inguinal hernioplasties in Brazil. The State of São Paulo approved 22.303 HAG. The confirmed amounts were, respectively, R\$ 70.273.389,56 and R\$ 13.998.993,98. Therefore, this surgical procedure is among the sixth most performed in Brazil. (PORTELA, 1997). The choice of the primary unilateral inguinal hernioplasty procedure using polypropylene mesh (Lichtenstein technique) for this research was because it is a worldwide common surgical procedure (NOGUEIRA et al, 2015) and represents an important expense for public and private health in Brazil (COSTA, 2015), in addition to this procedure is used frequently in the institution where the authors work. The prevention with the allocation of resources, the concern with sustainability associated with his professional experience in the context of the supplementary health sector of this hospital, also contributed as a motivator for the choice of this theme. Therefore, the objective of this work is to present the hospital costs employed in performing the surgery of primary unilateral inguinal hernia repair using polypropylene mesh, under spinal anesthesia, in a private, philanthropic and non-profit teaching hospital in the State of São Paulo. It is necessary to compare them with the estimated amount of financial resources to pay by UHS and with the estimated amounts to pay by 07 HPO, to determine if these amounts are sufficient to cover the expenses dedicated to providing this service surgery in this teaching hospital.

Likewise, the estimated amounts of financial resources be paid both by UHS and by seven HPO will be compared, to analyze whether there is a difference between these values and to identify which of these organizations are more profitable to that hospital. As a hypothesis, we have that the situation experienced by this nonprofit philanthropic private teaching hospital is equivalent to several others, which have a predominant role in UHS care, which should offer a service provider with a minimum percentage of 60% for UHS to guarantee certification of philanthropic companies regulated by Law nº 12.101/2009 (TRINDADE, 2010). Many nonprofit teaching hospitals owe to banks, suppliers, in addition to federal taxes, such as guarantee fund collection, employee National Social Security Institute (NSSI), and labor liabilities. A portion of non-profit hospitals provides health insurance in the country and services to patients in a particular way. The financial deficit, which has been going on for more than a decade, is aggravated by the increase in expenses in the provision of services and has generated significant structural and technological scrapping, resulting in the closure of beds and restrictions to health care, in addition to losses to health professional qualification. (ABRAHUE, *Open Letter* - August /2017). In addition to the discrepancy in the UHS table, there are late payments by managers in the three spheres of government and there is no transfer of the excess ceiling for

hospitalizations and procedures. It occurs in different Brazilian hospitals. One of the alternatives has been to allocate up to 40% of their beds to patients with HPO and private patients, in addition to health plans specific to hospitals. At the end of 2018, 234 health plans sold by philanthropic companies registered with the National Supplementary Health Agency (NSHA), which are tax-free, cheaper competitive and represent an increasing source of resources for the sustainability of these hospitals. The NSHA is the regulatory agency linked to the Ministry of Health (MH), responsible for the health insurance sector in Brazil (Law nº 9.961/2000), establishing the general characteristics of the contractual instruments used in the activity of the operators, in addition to other duties. Health Plan Insurers are insurance companies that operate health insurance. They have an exclusive corporate purpose to operate in the Supplementary Health sector under Law nº. 10.185 (Feb 12th, 2001), for Law nº. 9.656 (Jun 3rd, 1998), and Law nº. 9.961 (Jan 28th, 2000), health insurance is classified as a private health care plan and the insurance company specializing in health as the operator of a private health care plan. To expose objectively, we sought to present in figures the cost values per bed-day and average time of surgery applied to two inpatient units and the hospital's surgical center, which is part of this study. Besides, we sought to highlight the prices charged by UHS and health insurance companies, which are part of the list of OPS admitted by this hospital and to compare them with each other.

## MATERIALS AND METHODS

This research was descriptive retrospective and consisted of a case study carried out in 2018 in a teaching, philanthropic and non-profit hospital in the State of São Paulo. In 2018, according to the National Health Establishment Register, the hospital had a structure formed by 812 beds and 24 operating rooms. Of these beds, 25 have assigned to the surgical gastroenterology unit, of which patients from UHS admit. In addition, another 20 beds have assigned to the Supplementary Health unit, for hospitalization of patients from HPO and private patients, not considering the Intensive Care Units. Thus, the sum of the beds contained in these two units is 45 beds. For the surgery, the same 24 operating rooms have considered, as they are in common use, both for UHS patients and for Supplementary Health. Thus, the costs of primary unilateral inguinal hernioplasty surgery using polypropylene mesh (Lichtenstein technique) and the price forecasts for sales of services provided by the hospital to UHS patients and beneficiaries of health plans.

The selection of 07 HPO was due to the commercial relationship with this hospital and because they are included in the list of ANS (SOUZA et al, 2013), where they have classified in a group of Insurance Companies, in addition to representing more than 60% of the revenue of the researched hospital. To investigate the data obtained, which were used as a basis for developing the information available in this study, public databases were consulted, such as PUBMED, BVS, DATAUHS and CNES looking for terms relevant to a unilateral inguinal hernia, polypropylene mesh, hospital medical costs, and health facilities. In addition to these databases, the research took place in the private systems of this teaching hospital, specifically for inpatient care, supplies, billing and an intermediate cost calculation system called Key Performance Indicators for Health (KPIH). However, the values applied for the pricing of hospital medical services

referring to the operation of primary unilateral inguinal hernia repairing polypropylene mesh obtained from the Management System of the Table of Procedures, Drugs, and HPO (SIGTAP) of HUS. It was made through HAG and specific tables of agreement between the hospital and the Pan American Health Organization (PAHO), such as fee and daily tables, medical fees (BHCMP - Brazilian Hierarchical Classification of Medical Procedures), medicines (BRASINDICE), materials (SIMPRO) and other material tables (Orthoses, Prostheses, and Special Materials (OPME) priced according to each negotiation. It was used the Microsoft Excel software to tabulate the numbers, perform calculations and build the graphs to generate the results. This application has considered a popularized tool that is easy to understand, as the available resources are intuitive, in addition to being a program in the private domain of the researcher in this study. The criterion used by this hospital to calculate costs is the absorption method that consists of the appropriation of all production costs (direct or indirect) and is allocated to the services of each unit. The understanding that the services provided must absorb costs is adequate with the legislation, both with strategic and operational management, once to observe the production costs it includes the apportionments received from the auxiliary and administrative cost centers, and the data found in reports generated by the KPIH system, outsourced by this teaching hospital. First, an individualized cost report by the center was requested, which allows you to view the composition of costs for a specific cost center, and its evolution through competencies. With this report, data was obtained regarding direct and indirect costs, fixed and variable, apportionments received, number of patient-days and unit cost of the service. The cost centers selected for calculating costs were the productive centers, the inpatient units of the surgical gastroenterology services, supplementary health care and the surgical center, including the apportionments received from the other auxiliary and administrative units of this hospital. Inpatient units of the surgical gastroenterology and supplementary health services, as well as the operating room, receive in addition to surgical cases of inguinal hernias, other different patients with different diagnoses and types of treatments.

For this reason, the total costs related to materials, drugs, and OPME allocated to these services have many variations in the numbers of quantities and values, which can directly influence the result of the unit value of each of these business units. Thus, to minimize distortions in the result of the unit cost per patient-day, the option was to subtract the total values of the variable costs of the materials, drugs, OPME and surgical wires that were been allocated directly in each of the cost centers related to these business units. The calculation of the cost to the operation of primary unilateral inguinal hernioplasty without concomitant disease and with the application of polypropylene mesh was been considered as one daily in a bed. It includes the time spent inside the operating room, preparations received from the auxiliary cost centers and administrative, the specific materials and medications delivered to the patient regarding the treatment period inside the hospital. To obtain the expected sale price of the provision of the financial resource service to be passed on by the UHS to the hospital, consultations made on the codes: 07.04.04.010-2 and 07.02.05.057-1 regarding the procedure of unilateral inguinal hernioplasty and inorganic mesh polypropylene. Through the SIGTAP, it was possible to obtain the separate values of the HAG by hospital service and by professional

service and HPO material (ANS, 2019). Likewise, to reach the estimated sales price for the provision of the service, for this same procedure, we consulted the code: 3.10.09.08-5 that has included in the Hierarchical Brazilian Classification of Medical Procedures (HBCMP) table, which has evaluated by the HPOs to make the payment to the hospital. Also, approximate calculations were made of the inputs applied in the regular practice operation provided by the surgeon, the audit nurse and the commercial supervisor who work in the supplementary health services of this hospital. The admissions to this teaching hospital, private and non-profit made by UHS in 2018 represented 94.21%, in contrast to those of HPO and Private, which reached 5.79%. From obtaining this information, it was possible to make comparisons, both between the costs employed by the hospital, as well as between the expenses and prices provided by UHS and the pricing assessed by the operators, as well as the average and median prices offered by these two public and private health administrators.

## RESULTS

We believe it is possible to show in the study, with a good probability of success, the costs of the operation of primary unilateral inguinal hernia repair using polypropylene mesh (Lichtenstein technique) performed in a teaching hospital, without to profit. We present the results of the cost analysis of the operation of primary unilateral inguinal hernia repair using polypropylene mesh, which has allocated in the productive cost centers of the inpatient business units of surgical gastroenterology and supplementary health, in addition to the center service surgery of a private, non-profit teaching hospital in the state of São Paulo. After that, we match the forecast for revenue amounts, from this surgery, to be pay by UHS and the HPO, to verify which of these organizations are more profitable. In continuity, we demonstrate the comparison between the costs and the revenue forecasts to be paid by UHS and by 07 HPO, to identify whether these revenue estimates are sufficient to provide the expenses for this surgery in that hospital. Finally, the forecast of the values of the financial resources of this surgery paid by UHS has compared with the results of the average and median obtained from the estimates of revenues to be pay by 07 HPO who have a contract with this hospital.

1) We present the hospital costs of an inpatient bed for patients who underwent surgery for primary unilateral inguinal hernia repair using polypropylene mesh referring to the productive units of the surgical gastroenterology (UHS) and supplementary health (HPO) services.

a. Cost of the inpatient unit of the surgical gastroenterology service referring to UHS care:

**Table 1. Cost of bed-day per hospital for the treatment of primary unilateral inguinal hernia repair using polypropylene mesh - UHS - year: 2018**

Description of cost items	Cost amount	%
General	0,59	0,2
General Consumables	6,23	2,2
Materials and Medicines for use in the Patient	43,46	15,0
Own Staff	222,56	76,8
Services provision	17,02	5,9
(1) Total direct/indirect costs	289,86	46,9
(2) Apportionments received	327,88	53,1
(3) Total costs(1) + (2)	617,74	

Source: Cost System - KPI - Key Performance Indicators for Health outsourced by the Hospital. Prepared by the authors.

The total cost of a bed per hospitalization for the treatment of primary unilateral inguinal hernia repair using polypropylene mesh in the surgical gastroenterology service unit for UHS care is R\$ 617,74 (100%). The total direct/indirect costs are R\$ 289,86(46.9%) and the total apportionments received is R\$ 327,88 (53.1%).

b. Cost of the inpatient unit of the supplementary health service referring to HPO service:

**Table 2. Cost of day-bed for hospitalization referring to primary unilateral inguinal hernioplasty operation with application of polypropylene mesh - HPO - year: 2018- value (R\$)**

Description of cost items	Cost amount	%
General	5,78	2,3
General Consumables	3,00	1,2
Materials and Medicines for use in the Patient	43,46	17,1
Own Staff	200,68	79,0
Services Provision	1,07	0,4
(1) Total direct/indirect costs	253,99	44,1
(2) Apportionments received	321,85	55,9
(3) Total costs (1) + (2)	575,83	

Source: Cost System - KPI - Key Performance Indicators for Health outsourced by the Hospital. Prepared by the authors.

The total cost of a bed per hospitalization for the treatment of primary unilateral inguinal hernioplasty with the application of polypropylene mesh in the supplementary health service unit for HPO care is R\$ 575,83 (100%). The total direct/indirect costs are R\$ 253,99 (44.1%) and the total apportionments received is R\$ 321,85 (55.9%).

1) Cost of the operating room for primary unilateral inguinal hernia repair using polypropylene mesh for patients coming from UHS and for HPO beneficiaries:

a. Costs of an operating room for the operation of UHS patients:

**Table 3. Cost of the operating room to operate primary unilateral inguinal hernia repair using polypropylene mesh - UHS - year: 2018- value (R\$)**

Description of cost items	Cost amount	%
General	0,96	0,2
General Consumables	1,95	0,4
Materials and Medicines for use in the Patient	405,65	83,8
Non-Medical Personnel	0,10	0,0
Own Staff	30,61	6,3
Staff RelatedUnits	43,09	8,9
Services provision	1,91	0,4
(1) Total direct/indirect costs	484,26	75,8
(2) Apportionments received	154,60	24,2
(3) Total costs (1) + (2)	638,86	

Source: Cost System - KPI - Key Performance Indicators for Health outsourced by the Hospital. Prepared by the authors.

The total cost of an operating room to perform primary unilateral inguinal hernioplasty surgery with the application of polypropylene mesh by UHS is R\$ 638,86 (100%). The total direct/indirect costs are R\$ 484,26 (75.8%) and the total apportionments received is R\$ 154,60 (24.2%).

b. Costs of an operating room for the operation of patients benefiting from HPO:

**Table 4. Cost of the surgical center to operate primary unilateral inguinal hernia repair using polypropylene mesh - HPO - year: 2018 - value (R\$)**

Description of cost items	Cost amount	%
General	0,96	0,2
General Consumables	1,95	0,3
Materials and Medicines for use in the Patient	483,65	86,0
Non-Medical Personnel	0,10	0,0
Own Staff	30,61	5,4
Staff RelatedUnits	43,09	7,7
Services provision	1,91	0,3
(1) Total direct/indirect costs	562,26	78,4
(2) Apportionments received	154,60	21,6
(3) Total costs (1)+(2)	716,86	

Source: Cost System - KPI - Key Performance Indicators for Health outsourced by the Hospital. Prepared by the authors.

The total cost of an operating room for primary unilateral inguinal hernioplasty surgery with the application of polypropylene mesh for HPO is R\$ 716,86 (100%). The total of direct/indirect costs is R\$ 562,26 (78.4%) and the total apportionments received are R\$ 154,60 (21.6%).

2) The total cost of primary unilateral inguinal hernioplasty surgery using polypropylene mesh for hospitalization of UHS and HPO patients:

**Table 5. Total cost of the operation of primary unilateral inguinal henioplasty using polypropylene mesh by the Unified Health System - UHS and by the Health Plans Operator - HPO, year: 2018 - value (R\$)**

	UHS	Operator
Bed-day cost per hospitalization	617,74	575,83
Operating room cost	638,86	716,86
Total surgery costs:	1.256,60	1.292,69

Source: Cost System - KPI - Key Performance Indicators for Health outsourced by the Hospital. Prepared by the authors.

The total amount of costs to perform a unilateral primary inguinal hernioplasty surgery with application of polypropylene mesh contains one daily with the remuneration of the personnel, materials, medicines and other necessities for the treatment and the use of 1h30m of a room adequate surgical for this type of procedure inside the operating room. It includes the use of a polypropylene mesh for a patient of UHS origin is R\$ 1.256,60 and for a patient of Supplementary Health origin is R\$ 1.292,69.

3) Forecast of revenue amounts to be pay by UHS and 07 HPO - PAHO referring to the provision of hospital services, professionals and OPME (polypropylene mesh) employed in the surgery of primary unilateral inguinal hernioplasty with the application of mesh screen polypropylene performed in a philanthropic hospital

4) Results of UHS revenue figures forecasts compared to Health Plan Insurers versus costs for performing a unilateral primary inguinal hernioplasty surgery using polypropylene mesh at this hospital

5) Average and Median of the estimated values of the revenue of the Operators and the expected value of the UHS revenue for the payment of the surgery for primary unilateral inguinal hernia repair using polypropylene mesh in a philanthropic hospital:

**Table 6. Revenue X Cost of operation of primary unilateral inguinal hernia repair using polypropylene mesh - year: 2018 - value (R\$)**

	HUS	Insurer 1	Insurer 2	Insurer 3	Insurer 4	Insurer 5	Insurer 6	Insurer 7
Revenue	547,51	3.783,08	3.709,37	3.180,51	3.311,31	3.040,57	3.320,76	3.494,52
Costs	1.256,60	1.292,69	1.292,69	1.292,69	1.292,69	1.292,69	1.292,69	1.292,69
Results	-709,09	2.490,39	2.416,68	1.887,82	2.018,62	1.747,88	2.028,07	2.201,83

Source: SIGTAP - System of Management of the Table of Procedures, Medicines and HPO Cost System - KPI - Key Performance Indicators for Health outsourced by the Hospital. Elaborated by the authors

**Table 7. Revenues x Costs per operation of Primary Unilateral Inguinal Hernioplasty with Application of Polypropylene Mesh - by agreement - year: 2018- value (R\$)**

	HUS	Insurer 1	Insurer 2	Insurer 3	Insurer 4	Insurer 5	Insurer 6	Insurer 7
Revenue	547,51	3.783,08	3.709,37	3.180,51	3.311,31	3.040,57	3.320,76	3.494,52
Costs	1.256,60	1.292,69	1.292,69	1.292,69	1.292,69	1.292,69	1.292,69	1.292,69
I.U. (bed)	617,74	575,83	575,83	575,83	575,83	575,83	575,83	575,83
C.C.	638,86	716,86	716,86	716,86	716,86	716,86	716,86	716,86
Results	-709,09	2.490,39	2.416,68	1.887,82	2.018,62	1.747,88	2.028,07	2.201,83

Source: Authors.

**Table 8. UHS Revenue, Average and Median Revenue from Health Insurance Companies - year: 2018 - value (R\$)**

	UHS	Insurers (average)	Insurers (median)
Hospital Services	400,55	2.923,42	2.905,50
Professional Services	146,96	482,32	442,24
Revenue amount per procedure	547,51	3.405,73	3.320,76

Source: author

- Standard deviation: Insurers: 251.47

**Table 9. DATAUHS - UHS hospital procedures - by place of hospitalization - Brazil. HAG approved surgical procedures: 2018**

> UHS hospital procedures - by place of stay - Brazil

HAG approved under Procedure

Procedure group: 04 Surgical procedures

Period: 2018

Procedure	Approved HAG
TOTAL	4.821.145
0411010034 CESARIAN CHILDREN	680.962
0415010012 TREATMENT WITH MULTIPLE SURGERIES	247.386
0411020013 POS-ABORTION / PUERPERAL CURATING	174.197
0411010026 CESARIAN CHILDREN IN HIGH-RISK MANAGEMENT	172.926
0407030026 CHOLECISTECTOMY	133.286
0407040102 INGUINAL / CRURAL HERNIOPLASTY (UNILATERAL)	120.342
0407020039 APENDICECTOMY	110.147
OTHERS (1,453 PROCEDURES)	3.181.899

Source: Ministry of Health - HUS Hospital Information System (HIS/UHS) – 2018

## DISCUSSION

The management of costs in philanthropic hospitals must be analogous to that employed in private companies and other segments, that is, that of determining and processing costs using reliable tools and methods for accurate financial administration. With this, it will be possible to face the challenge of keeping up with the growing demand for management improvements, together with the quality in the provision of services aimed at the well-being of the patient, which have closely related to the spending of these hospital institutions. The government and the HPO have demanded from hospitals more optimized treatments and procedures a greater number of services to solve problems with greater customer satisfaction at the lowest possible costs. One of the reasons considered is that the main objective of companies is profit, a fact that should also be applied to philanthropic hospital organizations, as these are constantly in need of improvements in operational processes, as well as the development of new technologies, which need financial investments.

In general, it can be considered that financial management could be performed more efficiently in hospital organizations, even in those institutions that do not seek profit as an income obtained in an economic transaction but should be concerned with making investments and improvements to be applied at the hospital itself. Also, we can evidence in the study the costs of the operation of primary unilateral inguinal hernia repair using polypropylene mesh (Lichtenstein technique) performed in a teaching hospital, non-profit.

From these data, we present the comparison between the cost of the operation and the prices of the financial resource expect to be transfer by UHS and the estimated amount to be pay by the Operators, to identify whether these prices are sufficient to guarantee the payment of expenses for this operation. Also, possible differences have presented, between the prices charged by UHS and the operators, to verify which of these health managers is more profitable.

**Table 10. DATAUHS - UHS hospital procedures - by place of hospitalization-Brazil. Total value (R\$) surgical procedures: 2018**

> UHS hospital procedures - by place of stay – Brazil  
 The total amount according to Procedure  
 Procedure group: 04 surgical procedures  
 Period: 2018

Procedimento	ApprovedHAG
TOTAL	7.781.316.987,12
0415010012 TREATMENT WITH MULTIPLE SURGERIES	765.436.117,59
0411010034 CESARIAN CHILDREN	491.855.085,89
0415020050 SEQUENTIAL PROCEDURES IN ONCOLOGY	421.426.987,51
0406030030 CORONARY ANGIOPLASTY WITH STENT IMPLANT	264.194.956,34
0415030013 SURGICAL TREATMENT IN POLITRAUMATIZED	232.097.282,06
0406010935 MYOCARDIC REVASCULARIZATION WITH EXTRACORPORATE USE (C / 2 OR MORE GRAFTS)	229.011.615,84
0406030022 CORONARY ANGIOPLASTY WITH TWO STENTS IMPLANT	217.288.259,63
0415020034 OTHER PROCEDURES WITH SEQUENTIAL SURGERIES	212.876.640,78
0411010026 CESARIAN CHILDREN IN HIGH-RISK MANAGEMENT	205.789.969,13
0412040166 THORACOSTOMY WITH CLOSED PLEURAL DRAINAGE	123.519.442,68
0406010650 TRANSVENOUS DOUBLE CAMERA PASSAGE IMPLANT	120.574.188,73
0407030026 CHOLECISTECTOMY	117.111.605,92
0415040035 ULCERA / DEVITALIZED FABRICS FOLDING	110.199.108,28
0406010692 IMPLANT OF VALVE PROTESIS	91.822.429,03
0415020077 SEQUENTIAL PROCEDURES IN NEUROSURGERY	90.112.704,80
0404010377 TRACHEOSTOMY	85.422.784,16
0407030034 VIDEOLAPAROSCOPIC CHOLECISTECTOMY	77.273.015,91
0406030049 PRIMARY CORONARY ANGIOPLASTY	73.429.322,18
0407040102 INGUINAL / CRURAL HERNIOPLASTY (UNILATERAL)	70.273.389,56
OTHERS (1,453 PROCEDURES)	3.781.602.081,10

Source: Ministry of Health - HUS Hospital Information System (HIS/UHS) – 2018

**Table 11. DATAUHS - UHS hospital procedures - by place of hospitalization - State of São Paulo. HAG approved surgical procedures: 2018**

> UHS hospital procedures - by place of hospitalization - Brazil  
 HAG approved under Procedure  
 Federation Unit: São Paulo  
 Procedure group: 04 surgical procedures  
 Period: 2018

Procedure	Approved HAG
TOTAL	1.067.143
0411010034 CESARIAN CHILDREN	112.452
0415010012 TREATMENT WITH MULTIPLE SURGERIES	56.363
0411010026 CESARIAN CHILDREN IN HIGH-RISK MANAGEMENT	39.059
0411020013 POS-ABORTION / PUERPERAL CURATING	31.281
0407030034 VIDEOLAPAROSCOPIC CHOLECISTECTOMY	27.570
0405050372 FACOEMULSIFICATION WITH FOLDING INTRA-OCULAR LENS IMPLANT	24.833
0407020039 APENDICECTOMY	22.971
0407040102 INGUINAL / CRURAL HERNIOPLASTY (UNILATERAL)	22.303
0407040129 UMBILICAL HERNIOPLASTY	18.228
OTHERS (1,402 PROCEDURES)	712.083

Source: Ministry of Health - HUS Hospital Information System (HIS/UHS) - 2018

**Table 12. DATAHUS - HUS hospital procedures - by place of hospitalization - State of São Paulo. Total value (R\$) surgical procedures: 2018**

> HUS hospital procedures - by place of hospitalization – Brazil  
 The total amount according to Procedure  
 Federation Unit: São Paulo  
 Procedure group: 04 surgical procedures  
 Period: 2018

Procedure	Total Amount
TOTAL	1.706.981.391,48
0415010012 TREATMENT WITH MULTIPLE SURGERIES	178.404.069,26
0411010034 CESARIAN CHILDREN	81.891.337,54
0415020050 SEQUENTIAL PROCEDURES IN ONCOLOGY	72.420.254,89
0406030030 CORONARY ANGIOPLASTY WITH STENT IMPLANT	67.227.950,72
0406030022 CORONARY ANGIOPLASTY WITH TWO STENTS IMPLANT	49.003.938,46
0406010935 MYOCARDIC REVASCULARIZATION WITH EXTRACORPORATE USE (C / 2 OR MORE GRAFTS)	48.221.895,97
0411010026 CESARIAN CHILDREN IN HIGH-RISK MANAGEMENT	45.037.818,97
0415020034 OTHER PROCEDURES WITH SEQUENTIAL SURGERIES	44.314.333,00
0415030013 SURGICAL TREATMENT IN POLITRAUMATIZED	30.554.731,57
0407030034 VIDEOLAPAROSCOPIC CHOLECISTECTOMY	25.983.081,14
0406010650 TRANSVENOUS DOUBLE CAMERA PASSAGE IMPLANT	25.090.491,09
0412040166 THORACOSTOMY WITH CLOSED PLEURAL DRAINAGE	24.198.773,15
0405050372 FACOEMULSIFICATION WITH FOLDING INTRA-OCULAR LENS IMPLANT	23.110.069,59
0415020077 SEQUENTIAL PROCEDURES IN NEUROSURGERY	19.284.590,50
0406010692 IMPLANT OF VALVE PROTESIS	18.783.741,01
0415040035 ULCERA/DEVITALIZED FABRICS FOLDING	16.675.499,72
0407030026 CHOLECISTECTOMY	16.574.263,62
0406030049 PRIMARY CORONARY ANGIOPLASTY	16.298.641,94
0408050632 SURGICAL TREATMENT OF TRANSTROCANTERIAL FRACTURE	16.196.294,59
0407020039 APENDICECTOMY	14.799.994,75
0408040092 TOTAL PRIMARY ARTHROPLASTY, UNCEMENTED / HYBRID	14.549.744,36
0407040102 INGUINAL / CRURAL HERNIOPLASTY (UNILATERAL)	13.998.993,98
OTHERS (1,402 PROCEDURES)	844.360.881,66

Source: Ministry of Health - HUS Hospital Information System (HIS/UHS) - 2018

**Table 13. DATAHUS - SIGTAP - HUS Procedures, Medicines, and HPO Management System; Procedure value: 04.07.04.010-2 – Inguinal/CRURALHernioplasty (Unilateral) - R\$ 445.51: 2018**

Procedure:	04.07.04.010-2 - INGUINAL/CRURAL HERNIOPLASTY (UNILATERAL)		
Group:	04 - Surgical procedures		
Sub-Group:	07 - Surgery of the digestive system, attached organs, and abdominal wall 04 - Abdominal wall and cavity		
Form of Organization:			
Competence:	December/18		
Service Type:	Hospital Day Hospital		
Complexity:	Medium Complexity		
Financing:	Medium and High Complexity (MHC)		
FinancingSub-Type:			
Registration Instrument:	HAG (Main Proc.)		
Sex:	Both		
AverageStay:	2		
Length of Stay:			
Maximum Quantity:	1		
Minimum age:	0 months		
Maximum Age:	130 years		
Points:	150		
Complementary Attributes:	Includes value of anesthesia admits permanence to the largest Elective Surgeries Allows Surgical Team Information.		
Values			
Outpatient Service:	R\$0,00	Hospital Service:	R\$298,55
Outpatient Total:	R\$0,00	Professional Service:	R\$146,96
		Hospital Total:	R\$445,51

Source: SIGTAP - UHS System Management Table of Procedures, Drugs, and OPM – 2018

**Table 14. DATAUHS - SIGTAP - UHS System Management Table for Procedures, Drugs and OPM; OPM value: 07.02.05.057-1 - Small Inorganic Polypropylene Canvas (up to 100 cm<sup>2</sup>) - R\$102,00: 2018**

Procedure:	07.02.05.057-1 - INORGANIC SMALL POLYPROPYLENE SCREEN (UP TO 100 CM2)		
Group:	07 - Orthoses, prostheses, and special materials		
Sub-Group:	02 - Orthoses, prostheses and special materials related to the surgical act		
Form of Organization:	05 - Common OPM		
Competence:	December /18		
Service Type:	Hospital Day Hospital		
Complexity:	Not applicable		
Financing:	Medium and High Complexity (MHC)		
Financing Sub-Type:			
Registration Instrument:	HAG (Main Proc.)		
Sex:	Both		
Average Stay:			
Length of Stay			
Maximum Quantity:	2		
Minimum age:	Not applicable		
Maximum Age:	Not applicable		
Points:			
Complementary Attributes:			
Values			
Outpatient Service:	R\$0,00	Hospital Service:	R\$102,00
Outpatient Total:	R\$0,00	Professional Service:	R\$0,00
		Hospital Total:	R\$102,00

Source: SIGTAP - UHS Table of Procedures, Medicines, and OPM Management System - 2018

## Conclusion

The costs arising from treatment through primary unilateral inguinal hernia repair using polypropylene mesh used to care for HPO beneficiaries are higher (2.8%) than those consumed by UHS. On the other hand, the average revenue forecast in seven operators surveyed by us proved to be (622%), that is, 6.22 times higher than that of UHS. Besides, UHS revenue is insufficient to cover expenses, resulting in negative profitability (approximately -56.4%) related to this surgical procedure and, therefore, the HPOs enable this hospital to achieve greater profitability (approximately 163, 5%) in the operation of this procedure. The authors conclude that carry out this procedure on the premises of this hospital for the care of UHS patients does not support the expenses, while the offer

coming from beneficiaries of the studied HPOs helps notably in its sustainable development.

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