

# Robotic adrenalectomy: evaluation of cost-effectiveness

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**Abstract:** Laparoscopic adrenalectomy (LA) is the preferred treatment option for adrenal lesions, considering the improved patients outcomes, due to the reduced postoperative morbidity and postoperative pain, the faster recovery and the shorter length of hospital stay. The widespread diffusion of robotic technology led to the development and standardization of robot-assisted approach to adrenalectomy. However, to date, no clear benefit from the use of the robot-assisted approach has been found. The higher costs remain an important drawback and limit the implementation of robot-assisted adrenalectomy (RA) programs. This review summarizes the current available data regarding RA including its operative outcomes, advantages and drawbacks in comparison with conventional LA, evaluating its cost-effectiveness.

**Keywords:** Robotic adrenalectomy; minimally invasive adrenalectomy; adrenal tumours; cost-effectiveness; personalized medicine

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## Introduction

Adrenalectomy is a technically demanding procedure which requires careful and meticulous dissection around major vessels and organs in a relatively narrow space as retroperitoneum is.

Laparoscopic adrenalectomy (LA) has become the preferred treatment option for adrenal lesions since first being performed in 1992 by Gagner *et al.* (1), considering the improved patients outcomes, due to the reduced postoperative morbidity and postoperative pain, the faster recovery and the shorter length of hospital stay (2-5).

Currently LA is the “gold standard” treatment for the management of most adrenal surgical diseases, with an

overall postoperative complication rate of about 10% (4-7). The growing experience with LA and the excellent results of this procedure have led several authors to propose it also for large and potentially malignant adrenal tumors (8-10). However, the experience is limited and no conclusive data are available yet (10-13).

In 1999, Piazza *et al.* (14) and Hubens *et al.* (15) reported the first cases of robot-assisted adrenalectomy (RA) using the ZEUS AESOP (Computer Motion, Inc., Santa Barbara, CA, USA). After the introduction of the da Vinci system (Intuitive Surgical, Sunnyvale, CA, USA), several series of robotic surgical procedures have been reported.

The widespread diffusion of robotic technology has led to the development and standardization of robot-assisted

## 2019 Journal Performance Data for: Gland Surgery

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CHINA MAINLAND

### TITLES

ISO: Gland Surg.

JCR Abbrev: GLAND SURG

### LANGUAGES

English

### CATEGORIES

SURGERY -- SCIE

### PUBLICATION FREQUENCY

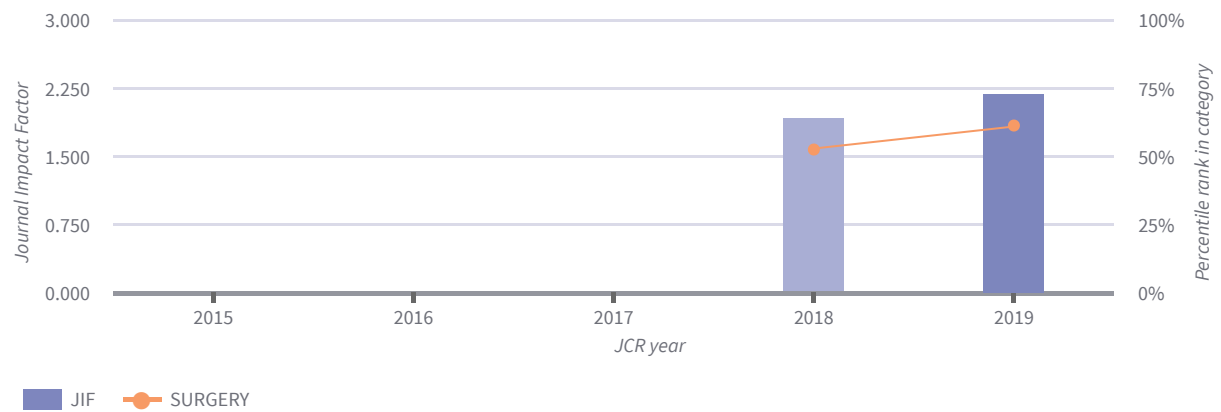
6 issues/year

The data in the two graphs below and in the Journal Impact Factor calculation panels represent citation activity in 2019 to items published in the journal in the prior two years. They detail the components of the Journal Impact Factor. Use the "All Years" tab to access key metrics and additional data for the current year and all prior years for this journal.

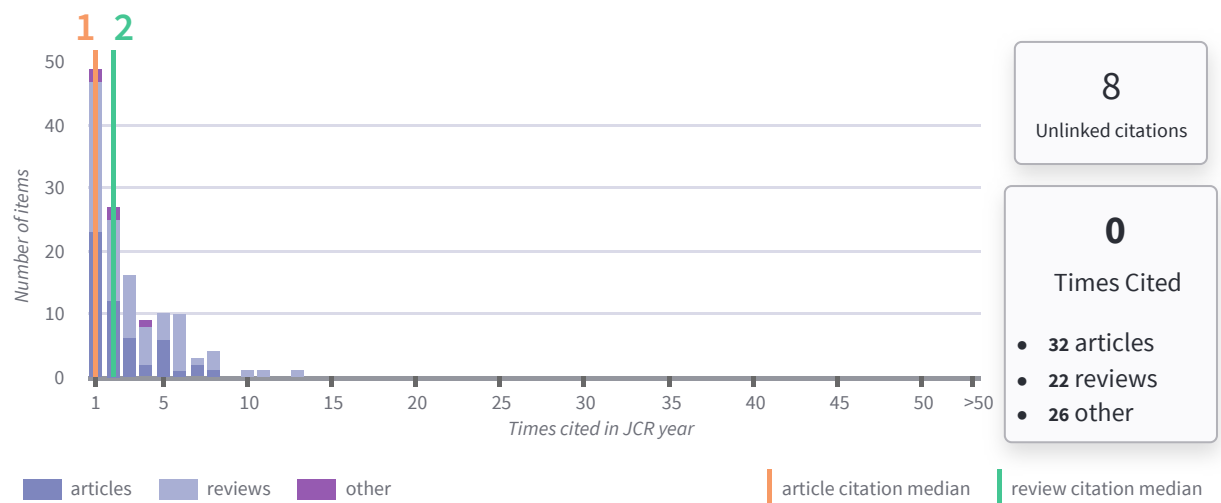
### 2019 Journal Impact Factor & percentile rank in category for: Gland Surgery

**2.190**

2019 Journal Impact Factor



### 2019 JIF Citation Distribution for: Gland Surgery



**Journal Impact Factor Calculation**

$$2019 \text{ Journal Impact Factor} = \frac{392}{179} = 2.190$$

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How is Journal Impact Factor Calculated?

$$\text{JIF} = \frac{\text{Citations in 2019 to items published in } \mathbf{2017 (274) + 2018 (118)}}{\text{Number of citable items in } \mathbf{2017 (111) + 2018 (68)}} = \frac{392}{179}$$

## Journal Impact Factor contributing items

Citable items in 2018 and 2017 (179)

TITLE	CITATIONS COUNTED TOWARDS JIF
<p>Understanding rare adverse sequelae of breast implants: anaplastic large-cell lymphoma, late seromas, and double capsules</p> <p>By: Clemens, Mark W.; Nava, Maurizio Bruno; Rocco, Nicola; Miranda, Roberto N.</p> <p><b>Volume: 6 Page: 169-184 Accession number: WOS:000401324600007</b></p> <p><b>Document Type: Review</b></p>	<b>13</b>
<p>Breast implant design</p> <p>By: Maxwell, G. Patrick; Gabriel, Allen</p> <p><b>Volume: 6 Page: 148-153 Accession number: WOS:000401324600004</b></p> <p><b>Document Type: Review</b></p>	<b>11</b>
<p>Silicone breast implant rupture: a review</p> <p>By: Hillard, Christopher; Fowler, Jason D.; Barta, Ruth; Cunningham, Bruce</p> <p><b>Volume: 6 Page: 163-168 Accession number: WOS:000401324600006</b></p> <p><b>Document Type: Review</b></p>	<b>10</b>
<p>Current role of interventional radiology in the management of visceral and bone metastases from thyroid cancer</p> <p>By: Cazzato, Roberto Luigi; Gangi, Afshin; Garnon, Julien; Koch, Guillaume; Shaygi, Behnam et al.</p> <p><b>Volume: 7 Page: 80-88 Accession number: WOS:000429846400004 Document Type: Review</b></p>	<b>8</b>
<p>Interventional radiology of the thyroid gland: critical review and state of the art</p> <p>By: Barile, Antonio; Caranci, Ferdinando; Splendiani, Alessandra; Di Cesare, Ernesto; Masciocchi, Carlo et al.</p> <p><b>Volume: 7 Page: 132-146 Accession number: WOS:000429846400009</b></p> <p><b>Document Type: Review</b></p>	<b>8</b>
<p>Comparison of indocyanine green fluorescence and parathyroid autofluorescence imaging in the identification of parathyroid glands during thyroidectomy</p> <p>By: Kahramangil, Bora; Berber, Eren</p> <p><b>Volume: 6 Page: 644-648 Accession number: WOS:000423438800007</b></p> <p><b>Document Type: Article</b></p>	<b>8</b>
<p>Breast cancer-related lymphedema: risk factors, precautionary measures, and treatments</p> <p>By: Gillespie, Tessa C.; Sayegh, Hoda E.; Brunelle, Cheryl L.; Daniell, Kayla M.; Taghian, Alphonse G.</p> <p><b>Volume: 7 Page: 379-403 Accession number: WOS:000441342900005</b></p> <p><b>Document Type: Review</b></p>	<b>8</b>

**Citations in 2019 (392)**

TITLE	CITATIONS COUNTED TOWARDS JIF
"GLAND SURGERY"	30
"PLASTIC AND RECONSTRUCTIVE SURGERY-GLOBAL OPEN"	13
"PLASTIC AND RECONSTRUCTIVE SURGERY"	11
"ANNALS OF SURGICAL ONCOLOGY"	10
"AESTHETIC SURGERY JOURNAL"	9
"JOURNAL OF LAPAROENDOSCOPIC & ADVANCED SURGICAL TECHNIQUES"	7
"ENDOCRINE"	6
"MEDICINE"	6
"ANZ JOURNAL OF SURGERY"	5
"LANGENBECKS ARCHIVES OF SURGERY"	5

## Source data

## Journal source data 2019

	Articles	Reviews	Combined(C)	Other(O)	Percentage(C/(C+O))
Number in JCR Year 2019 (A)	74	51	125	29	81%
Number of References (B)	1,831	2,244	4,075	315	93%
Ratio (B/A)	24.7	44.0	32.6	10.9	

Box plot

Category Box Plot 2019

Category Box Plot

The category box plot depicts the distribution of Impact Factors for all journals in the category. The horizontal line that forms the top of the box is the 75th percentile (Q1). The horizontal line that forms the bottom is the 25th percentile (Q3). The horizontal line that intersects the box is the median Impact Factor for the category.

Horizontal lines above and below the box, called whiskers, represent maximum and minimum values.

The top whisker is the smaller of the following two values:

the maximum Impact Factor (IF)

$Q1\ IF + 3.5(Q1\ IF - Q3\ IF)$

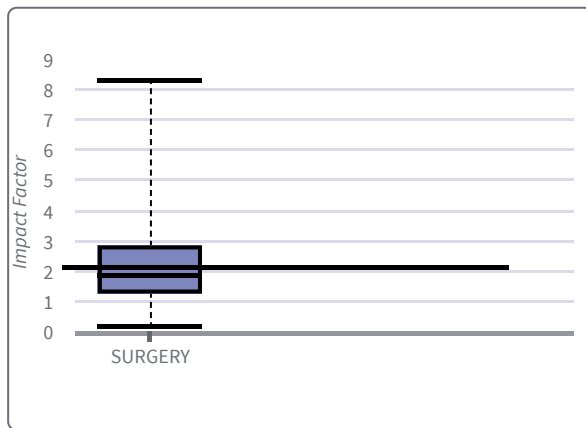
The bottom whisker is the larger of the following two values:

the minimum Impact Factor (IF)

$Q1\ IF - 3.5(Q1\ IF - Q3\ IF)$

Box Plots are provided for the current JCR year for each of the categories in which the journal is indexed.

**GLAND SURG, IF: 2.190**





Rank

Rank

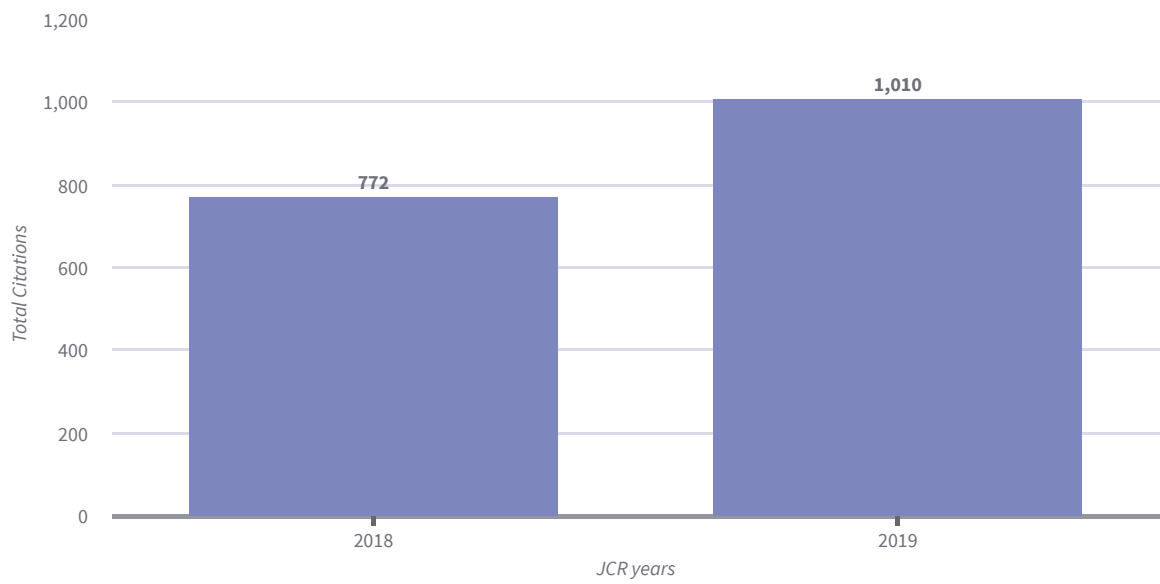
JCR Impact Factor

JCR Year	SURGERY		
	Rank	Quartile	JIF Percentile
2019	82/210	Q2	61.190
2018	97/203	Q2	52.463

**ESI Total Citations**

**Rank**

JCR Year	CLINICAL MEDICINE
2019	1624/2180-Q3
2018	1701/2108-Q4

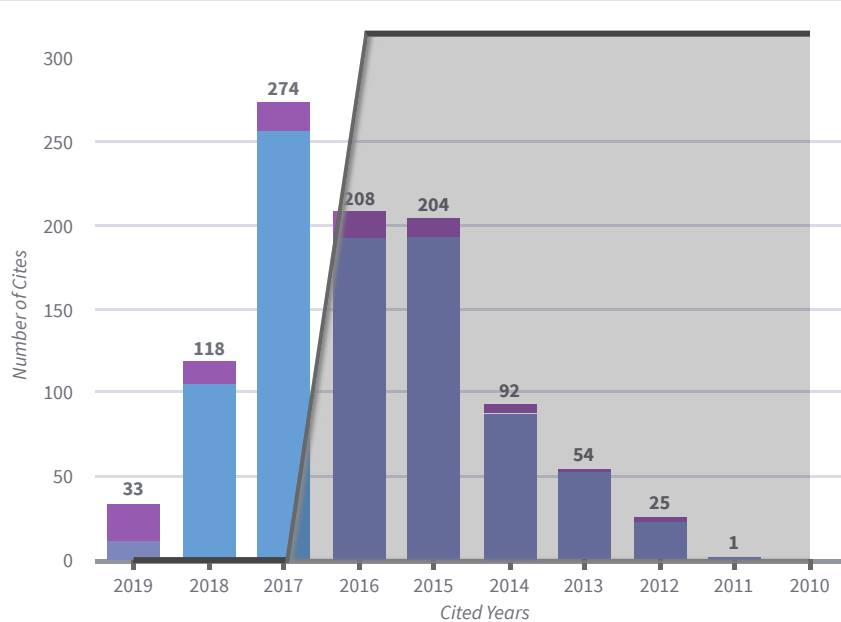


Cited Journal Data

Cited Half-Life Data

Cited Year	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009-All
#Cites from 2019	33	118	274	208	204	92	54	25	1	0	1
Cumulative %	3.27%	14.95%	42.08%	62.67%	82.87%	91.98%	97.33%	99.80%	99.90%	99.90%	100.00%

Cited Journal Graph 2019



CITED JOURNAL GRAPH

The Cited Journal Graph shows the distribution (by cited year) of citations published in journals during the JCR year to items published in the Journal during the last 10 years.

The white/grey division indicates the cited half-life (if  $t_{1/2} < 10.0$ ). Half of the citations are to items that were published more recently than the cited half-life.

The two light-blue columns indicate citations used to calculate the Impact Factor (always the 2nd and 3rd columns).

- Non-self-citations: citations from the journal to articles in other journals.
- Journal self - citations: citations from articles in the journal to articles in the same journal.

**Cited Journal Data 2019**

	Impact	Citing Journal	All Yrs	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	Rest
		ALL Journals	1,010	33	118	274	208	204	92	54	25	1	0	1
		ALL OTHERS (235)	235	1	37	58	46	37	28	19	7	1	0	1
1	2.190	GLAND SURG	85	21	13	17	15	11	5	1	2	0	0	0
2	4.235	PLAST RECONSTR SURG	28	1	3	8	7	6	1	1	1	0	0	0
3	2.390	J PLAST RECONSTR AES	23	0	0	3	9	7	3	1	0	0	0	0
4	4.061	ANN SURG ONCOL	19	0	7	3	0	3	2	4	0	0	0	0
5	1.404	J LAPAROENDOSC ADV S	15	0	0	7	5	3	0	0	0	0	0	0
6	3.799	AESTHET SURG J	14	0	0	9	2	1	1	1	0	0	0	0
7	1.354	ANN PLAS SURG	13	0	1	2	5	4	0	1	0	0	0	0
8	2.234	WORLD J SURG	13	0	0	4	6	2	1	0	0	0	0	0
9	1.552	MEDICINE	12	0	1	5	2	3	1	0	0	0	0	0
10	1.798	AESTHET PLAST SURG	11	1	0	4	2	1	2	1	0	0	0	0
11	1.991	BREAST J	10	0	0	0	1	2	3	3	1	0	0	0
12	3.959	EJSO-EUR J SURG ONC	10	0	3	2	3	2	0	0	0	0	0	0
13	2.465	LARYNGOSCOPE	10	0	0	4	1	5	0	0	0	0	0	0
14	1.323	CIR ESPAN	9	0	1	3	1	3	0	0	1	0	0	0
15	2.299	INT J ENDOCRINOL	9	0	1	4	2	1	0	1	0	0	0	0
16	1.841	J RECONSTR MICROSURG	9	0	1	0	3	2	2	0	1	0	0	0
17	3.235	ENDOCRINE	8	0	2	4	0	2	0	0	0	0	0	0
18	5.399	J CLIN ENDOCR METAB	8	0	2	1	3	0	2	0	0	0	0	0
19	5.676	BRIT J SURG	7	0	0	0	3	4	0	0	0	0	0	0
20	1.973	ENDOCR METAB IMMUNE	7	0	0	5	1	1	0	0	0	0	0	0
21	3.813	ENDOCRIN METAB CLIN	7	0	1	1	2	3	0	0	0	0	0	0
22	2.538	HEAD NECK-J SCI SPEC	7	0	0	5	1	1	0	0	0	0	0	0
23	3.574	INT J HYPERTHER	7	0	3	1	1	1	1	0	0	0	0	0
24	1.355	ANZ J SURG	6	0	1	4	1	0	0	0	0	0	0	0
25	6.126	CANCERS	6	0	0	0	3	0	3	0	0	0	0	0
26	2.647	CLIN BREAST CANCER	6	0	1	3	1	1	0	0	0	0	0	0
27	4.556	INT J MOL SCI	6	0	0	3	0	1	0	1	1	0	0	0
28	3.357	INT J SURG	6	0	0	3	1	1	1	0	0	0	0	0

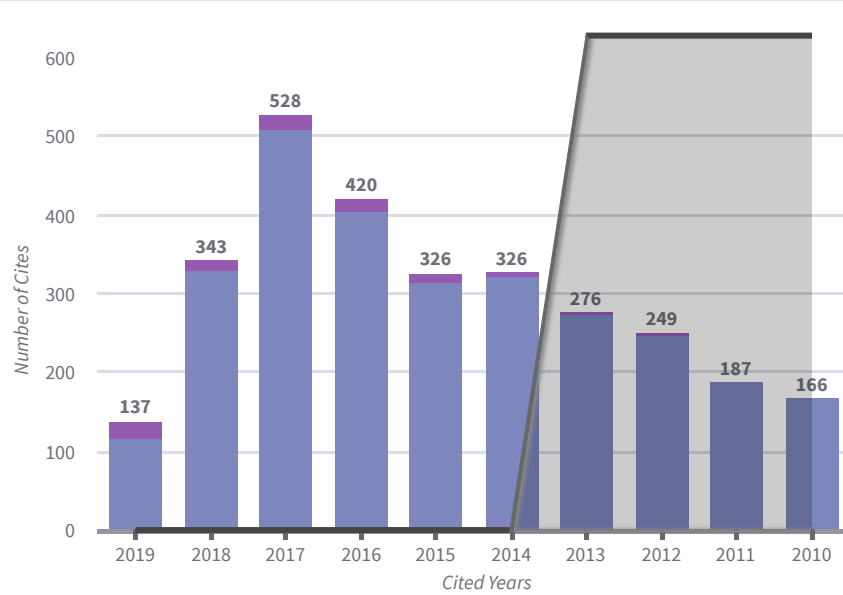
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Citing Journal Data

Citing Half-Life Data

Citing Year	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009-All
#Cites from 2019	137	343	528	420	326	326	276	249	187	166	1,432
Cumulative %	3.12%	10.93%	22.96%	32.53%	39.95%	47.38%	53.67%	59.34%	63.60%	67.38%	100.00%

Citing Journal Graph 2019



CITING JOURNAL GRAPH

The Citing Journal Graph shows the distribution (by cited year) of citations published in the Journal during the JCR year to items published in journals during the last 10 years.

The white/grey division indicates the citing half-life (if < 10.0). Half of the citations are to items that were published more recently than the citing half-life.

- Non-self-citations: citations from the journal to articles in other journals.
- Journal self - citations: citations from articles in the journal to articles in the same journal.

**Citing Journal Data 2019**

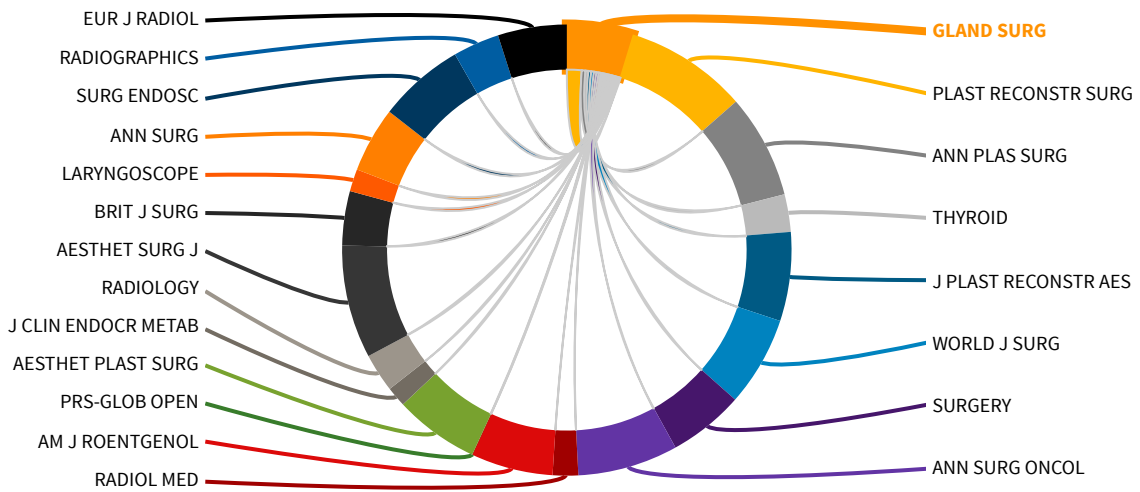
	Impact	Cited Journal	All Yrs	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	Rest
		ALL Journals	4,390	137	343	528	420	326	326	276	249	187	166	1,432
		ALL OTHERS (543)	543	9	56	54	53	34	45	48	30	20	16	178
1	4.235	PLAST RECONSTR SURG	433	2	16	73	34	36	17	31	31	22	19	152
2	1.354	ANN PLAS SURG	109	0	4	8	7	5	8	2	5	3	1	66
3	2.190	GLAND SURG	85	21	13	17	15	11	5	1	2	0	0	0
4	5.309	THYROID	85	3	9	14	16	12	7	3	4	0	2	15
5	2.390	J PLAST RECONSTR AES	84	3	4	8	12	8	9	3	6	2	8	21
6	2.234	WORLD J SURG	82	1	6	3	7	5	3	5	6	2	6	38
7	4.061	ANN SURG ONCOL	69	4	9	5	3	6	8	6	6	3	7	12
8	3.356	SURGERY	69	3	3	1	8	0	7	6	4	3	4	30
9	2.000	RADIOL MED	61	4	9	3	10	3	7	6	1	1	4	13
10	3.013	AM J ROENTGENOL	57	2	1	1	4	5	2	5	3	4	4	26
11	1.798	AESTHET PLAST SURG	55	0	6	3	2	4	2	5	7	1	1	24
12	5.399	J CLIN ENDOCR METAB	53	2	4	4	3	2	8	4	4	1	3	18
13	7.931	RADIOLOGY	50	0	1	0	1	2	3	2	5	6	2	28
14	3.799	AESTHET SURG J	49	0	6	9	6	4	5	2	0	4	3	10
15	5.676	BRIT J SURG	45	1	4	5	2	5	3	1	3	2	2	17
16	2.465	LARYNGOSCOPE	42	1	5	3	4	2	3	4	2	10	0	8
17	10.130	ANN SURG	40	1	2	2	3	2	1	2	0	1	1	25
18	3.149	SURG ENDOSC	39	1	4	5	5	2	1	6	1	3	1	10
19	4.967	RADIOGRAPHICS	38	0	2	5	4	1	2	0	0	0	1	23
20	2.687	EUR J RADIOL	33	0	1	0	0	4	2	3	4	1	5	13
21	3.959	EJSO-EUR J SURG ONC	32	3	4	3	2	1	3	1	3	2	2	8
22	32.956	J CLIN ONCOL	32	0	0	2	2	4	3	1	0	0	1	19
23	74.699	NEW ENGL J MED	32	0	0	0	4	2	2	0	3	0	1	20
24	4.101	EUR RADIOL	31	0	3	5	1	1	2	1	3	1	1	13
25	3.754	BREAST	27	1	0	4	2	3	1	2	5	3	2	4
26	5.772	CANCER-AM CANCER SOC	26	0	1	2	0	0	2	0	1	1	1	18
27	2.125	AM J SURG	25	0	1	2	0	2	3	0	2	2	1	12
28	3.380	CLIN ENDOCRINOL	25	1	1	3	5	0	3	0	1	1	3	7

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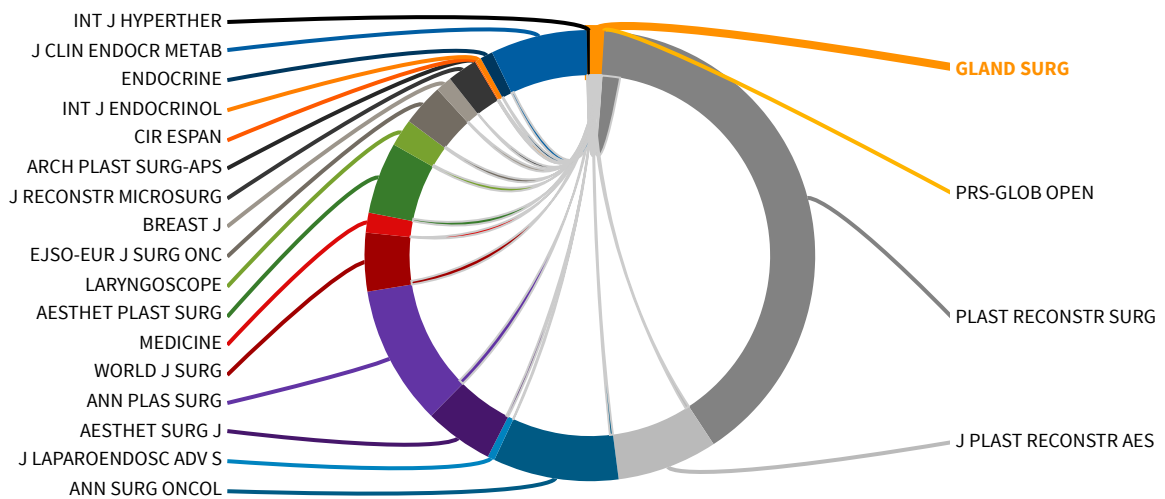
Journal Relationships

Journal Relationships 2019

Citing Data



Cited Data

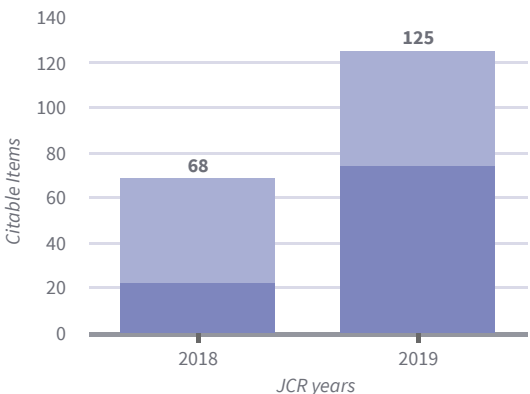
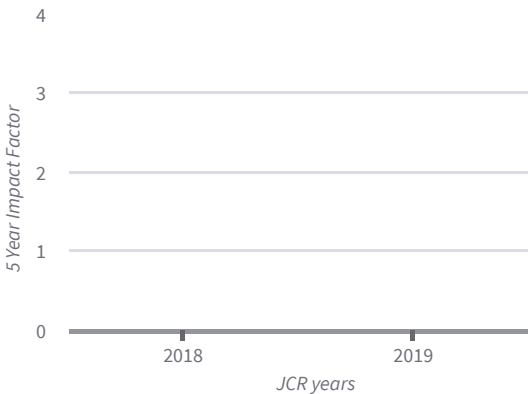
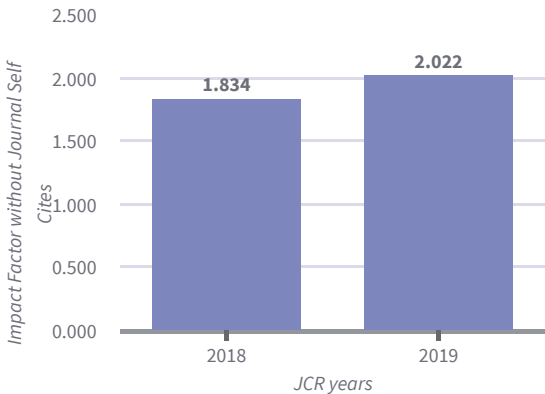
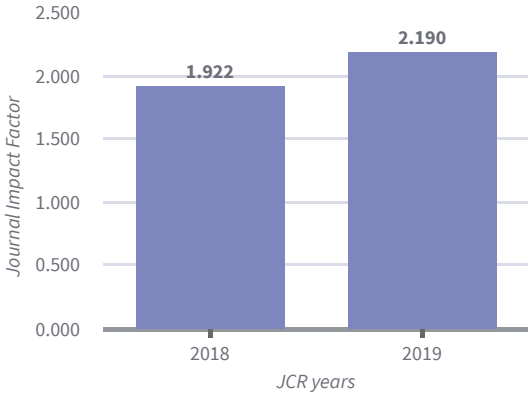


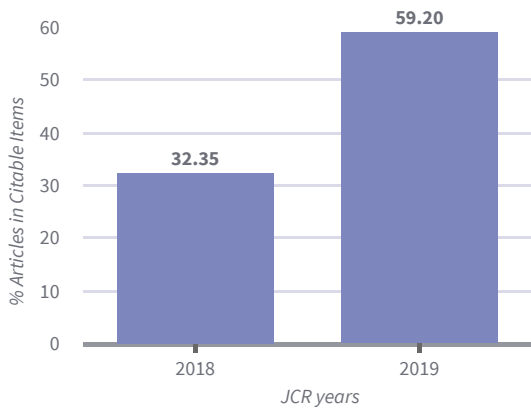
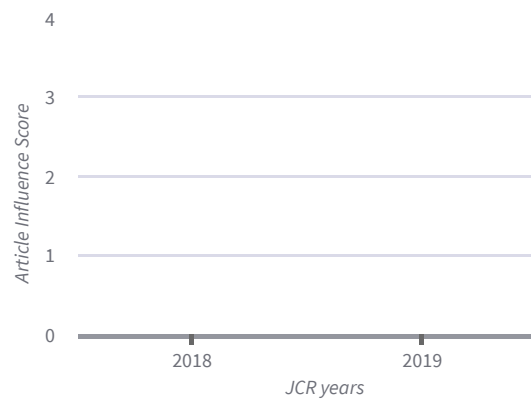
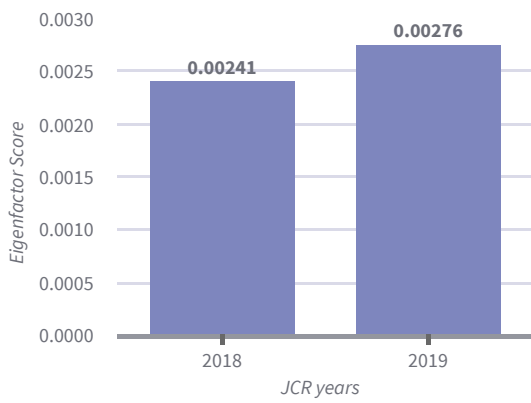
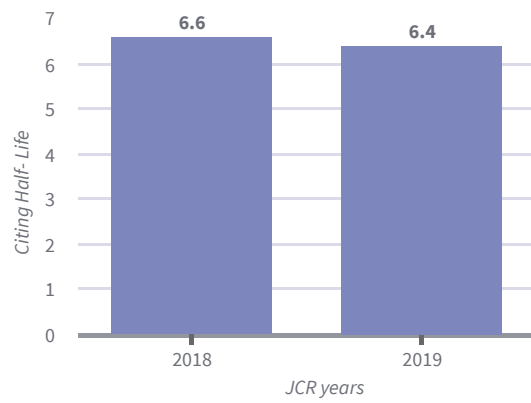
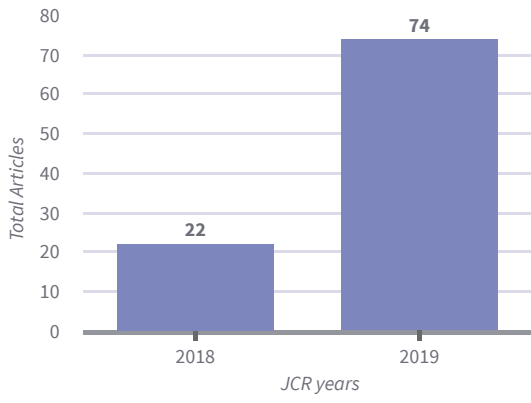
**Key Indicators 2019**

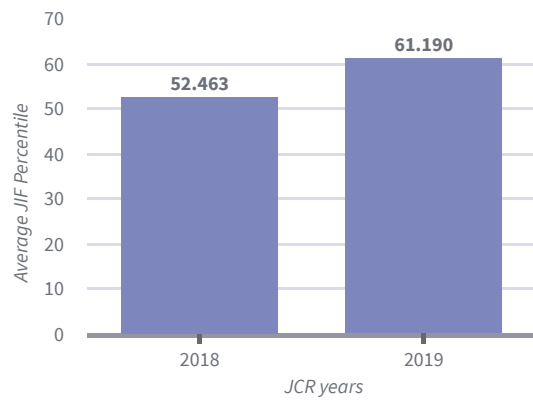
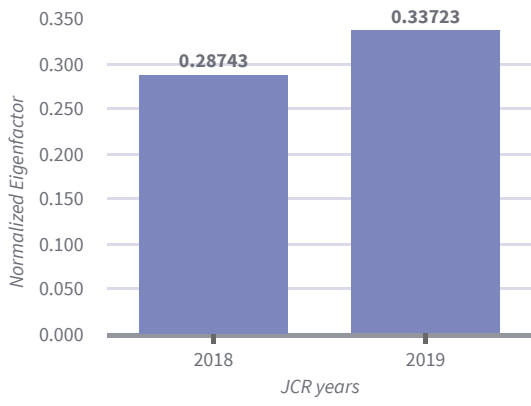
IMPACT METRICS		INFLUENCE METRICS		SOURCE METRICS	
Total Cites	1,010	Eigenfactor Score	0.00276	Citable Items	125
Journal Impact Factor	2.190	Article Influence Score	n/a	% Articles in Citable Items	59.20
5 Year Impact Factor	n/a	Normalized Eigenfactor	0.33723	Average JIF Percentile	61.190
Immediacy Index	0.264			Cited Half-Life	3.4
Impact Factor without Journal Self Cites	2.022			Citing Half-Life	6.4



Metric Trend

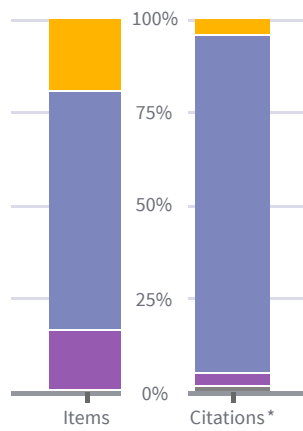






Journal profile [2017 - 2019]

Open Access (OA)



	Items	Citations*
<b>Gold OA Citable</b>	69	16
<b>Subscription and Free to Read Citable</b>	235	388
<b>Total Citable</b>	304	404
<b>% Citable Open Access</b>	22.70%	3.96%
<b>Other</b>	60	13
<b>Unlinked</b>	n/a	8

\* Citations in 2019 to items published in [2017 - 2019]

Contributions by country/region

country	count
1 USA	99
2 Italy	86
3 CHINA MAINLAND	45
4 England	32
5 South Korea	20
6 Australia	15
7 Singapore	13
8 Denmark	12
- Taiwan	12
10 Switzerland	11

Contributions by organizations

organization	count
1 UNIVERSITY OF MILAN	21
2 UNIVERSITY OF MESSINA	16
3 SAN PAOLO-POLO UNIVERSITARIA HOSPITAL	12
4 UNIVERSITY OF AQUILA	11
- UNIVERSITY OF INSUBRIA	11
6 MONASH UNIVERSITY	10
7 AOU POLICLINICO GAETANO MARTINO	9
- TULANE UNIVERSITY	9
- UNIVERSITA DELLA CAMPANIA VANVITELLI	9
- UNIVERSITY OF SOUTHERN DENMARK	9