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ORIGINAL ARTICLE

Clinical Comparison between Baska Mask and I-gel in Short Surgical Procedures: A Randomised Comparative Study

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ABSTRACT

Background and aims: Numerous newer Supraglottic Airway Devices (SADs) are available now a days and they are known for their reduced airway morbidity and improved hemodynamic stability. The aim of this prospective study was to compare the safety and efficacy between i-gel and Baska mask during adult short surgical procedures in terms of sealing pressure, insertion time, ease of insertion, airway pressures, hemodynamic disturbances and post-operative complications.

Methodology: This randomised comparative study was conducted in adult ASA physical status I and II patients aged 18-60 years who underwent elective short surgical procedures under general anaesthesia. The patients who satisfied the inclusion and exclusion criteria were randomly classified into two groups of 40 each; Group A (i-gel group) and Group B (Baska group). The sealing pressure, insertion time, number of attempts, ease of insertion, hemodynamic variations, airway pressures and post-operative complications were recorded.

Results: The mean insertion time was significantly lesser in i-gel group when compared to Baska mask group (14.1 ± 2.83 seconds vs 18.1 ± 4.24 seconds, respectively). But the sealing pressure was significantly higher with Baska mask (29.1 ± 5.13cm H_2O) when compared to i-gel (24.6 ± 4.64cm H_2O). The number of attempts, ease of insertion, hemodynamic variations, airway pressures and post-operative complications were similar between both the groups.

Conclusion: The i-gel was better in terms of insertion time but Baska mask had higher airway sealing pressure. Both SADs were similar in other aspects. Hence,

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Baska mask can be preferred to i-gel during surgeries requiring higher airway seal pressure.

KEYWORDS

• i-gel • Baska mask • Supraglottic airway devices • Laryngeal Mask Airway • Sealing pressure • Insertion time

INTRODUCTION

Supraglottic airway devices have revolutionized the management of airway during elective short surgical procedures. They have been used in place of endotracheal tubes for maintaining patent airway for ventilation, oxygenation and delivery of anaesthetic gases. The first generation SADs were designed for the purpose of securing the airway in emergency situations. Over a period of time, numerous improvements have been made resulting in the development of second generation SADs. They were designed to allow high positive pressure ventilation while reducing the risk of aspiration of gastric contents by providing ports for gastric access.

The i-gel is a second generation SAD which was introduced to clinical practice in 2007. It is an anatomically designed, non-inflatable gel like mask, which is soft and transparent and made of thermoplastic elastomer. The contour, shape and softness are perfectly created in such a way to exactly fit the peri-laryngeal anatomy and to provide a reliable seal without the need for an inflatable cuff. It also has the special features including a gastric channel, buccal cavity stabilizer, epiglottic rest and integral bite block.[1]

The Baska mask is a novel third generation SAD with a non-inflatable cuff, flexible body with tab, an esophageal drainage inlet, lateral channel to assist aspiration of gastric contents and an integral bite block.[2]

Both i-gel and Baska mask have non-inflatable cuff and gastric port for aspiration of gastric contents, with increasing use now a days. But, there is only limited data in the literature regarding the comparison between these two devices in adult short surgical procedures. Hence, this prospective study was designed to compare the efficacy of Baska mask and i-gel in short surgical procedures.

METHODOLOGY

Following Institutional Ethics committee approval, the Clinical Trials Registry - India CTRI registration was done (registration No. CTRI/2022/10/046774). This study was conducted in Apollo KH Hospital, Melvisharam between December 2022 to January 2024. All the patients were explained about the study protocol and a written informed consent was obtained for participation in the study. The patients of age 18 to 60 years belonging to ASA grade I & II who were posted for elective short surgical procedures of duration between 30 minutes to 1 hour were included in the study. The patients having reactive airway diseases, emergency procedures, difficult airway, BMI > 30 kg/m^2, head and neck surgical procedures, laparoscopic procedures, cervical spine disease and pregnant patients were excluded from the study. Pre-anaesthetic assessment with special attention to airway was done for all the patients who met the inclusion criteria and gave consent for the study. Mallampatti class, inter-incisor distance, temporo-mandibular joint mobility, thyromental distance, neck circumference and neck mobility were noted during airway assessment.

All the patients were kept in NPO for 6 hours prior to the surgery. They were premedicated intravenously with Inj. Pantoprazole 40mg and Inj. Metoclopramide 10 mg, 30 mins before shifting to OT. After shifting to OT, intravenous access was secured with 18G cannula. Standard monitoring devices were connected to the patient. Baseline parameters including blood pressure, Pulse rate and SpO_2 were recorded.

The study population was randomized into either of the two groups (Group A i-gel group and Group B-Baska group) by lots. Patients were placed in supine position with head in sniffing position. After pre-oxygenation for three minutes, all patients were administered with Inj. Glycopyrrolate 0.004mg/kg, Inj. Midazolam 0.02mg/kg and Inj. Fentanyl 2 mcg/kg. Anaesthesia was induced with

Inj.Propofol 2 mg/kg and Inj. Atracurium 0.5mg/kg was used as muscle relaxant. After facemask ventilation for three minutes, an appropriate size prior lubricated i-gel was inserted in group A patients and Baska mask in group B patients. The size of the device was decided according to the Patient's weight and manufacturer recommendations.

Proper placement of the inserted device was confirmed by normal chest movement, bilateral equal air entry on auscultation and first 6 square waveform tracings on the capnograph. An optimal insertion of the device was considered only if both an effective airway and a successful gastric tube insertion was achieved. The maximum insertion attempts was restricted to three, failing to it the airway was secured with an appropriate size endotracheal tube. The number of attempts and time for insertion were recorded. The timeinterval from the removal of the facemask to the first square wave on capnogram was noted and considered only if the optimal insertion was achieved. The ease of insertion was assessed with a 4 point scalebased on number of attempts (**Grade 1:** Easy - Device successfully inserted with first attempt, **Grade 2:** Difficult - Device successfully inserted with Second attempt, **Grade 3**: Very difficult - Device successfully inserted with Third Attempt and **Grade 4:** Impossible - when the device is not successfully insertedeven with 3 attempts).

The patients hemodynamic parameters (heart rate, systolic blood pressure, diastolic blood pressure, meanarterial pressure and saturation) were noted during first wave on capnogram after insertion, after 1 minute of insertion, and there after every five minutes upto thirty minutes of insertion. The sealing pressure was measured using a fresh gas flow rate of 5L/min, with closure of the adjustable pressure limiting valve of the anaesthetic circuit and recording the airway pressure when gas was heard leaking around the device.[3] The peak and plateau airway pressure were noted after 5 minutes of successful insertion.[4]

Anaesthesia was maintained with O2:N_2O(1:1), with sevoflurane (1-2%) in volume control mode in GE 9100cNXT ventilator, targeting end-tidal carbon dioxide 35-40 mmHg and end-tidal minimum alveolar concentration of 0.9-1.2. Supplementation of Inj. Atracurium 0.1mg/kg intravenously was given as per requirement. If there was any displacement or desaturation intraoperatively, it was noted. Adjusting the patient's head and neck position or position of the device to correct the displacement was allowed. If it was not possible to correct the displacement, then the device was removed and an appropriate size endotracheal tube was inserted. At the end of the surgery, all anaesthetics were tapered off and residual neuromuscular blockade was reversed with Inj. Neostigmine (0.05mg/kg) and Inj. Glycopyrrolate (0.01mg/kg). Once the patient met the extubation criteria, the device was removed. Cough, laryngospasm and breath holding if any, were noted after removal of the device. Aspiration, hoarseness and sorethroat were recorded after 1 hour of extubation.[5] Dysphagia was noted upto 24 hours postoperatively.

RESULTS

The insertion time in group A ranged between 9 to 20 seconds and in group B, it was between 11 to 30 seconds. The mean insertion time in group A and group B were 14.1 ± 2.83 seconds and 18.1 ± 4.24 seconds respectively. Thus, the mean insertion time in group A was lesser when compared to group B and it was statistically significant ($p<0.001$) (Table 3, Figure 1). The first attempt success rate in group A was 92.5 % (37 patients), but in group B it was 80% (32 patients). The first attempt success rate in group A was marginally higher when compared to group B. The remaining patients in both the groups were successfully intubated with second attempt. The p-value for number of attempts was 0.105, which was statistically insignificant, hence both the groups were comparable in terms of number of attempts (Table 3). 37 patients (92.5%) in group A and 32 patients (80%) were easily intubated whereas 3 patients (7.5%) in group A and 8 patients (20%) in group B had difficult insertion. None of the patients belonged to very difficult and impossible category with regard to ease of insertion (Table 3). There were no significant difference in ease of insertion between both the groups ($p=0.105$) and were comparable.

The systolic, diastolic and mean blood pressures recorded at various intervals did not differ significantly between both the groups and were comparable. The average heart rate in both the groups were similar and did not differ significantly ($p>0.05$). Similarly, no statistically significant difference was noted

Table 1: Demographic profile

Parameters		Group A	Group B	p-value
Age (years)*		40.2 ± 14.5	38.6 ± 12.7	0.7
Sex	Male (%)	25 (10)	17.5 (7)	0.4
	Female (%)	75 (30)	82.5 (33)	
Weight (kg)*		63.8 ± 13.56	61.9 ± 12.55	0.48
Height (cm)*		157 ± 9.26	158 ± 7.73	0.38
BMI (kg/m2)*		25.63 ± 3.30	24.49 ± 3.61	0.144

* Expressed as mean standard deviation

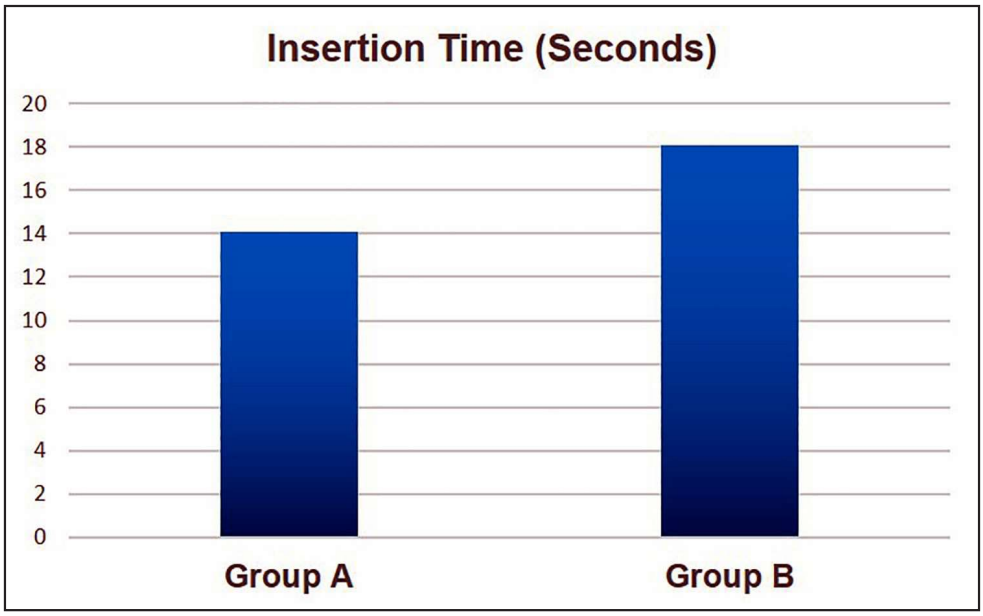

Figure 1: Insertion Time

Table 2: Airway assessment

Parameters		Group A	Group B	p-value
Inter-incisor distance* (cm)		5.34 ± 0.75	5.01 ± 0.53	0.3
Thyro-mental distance* (cm)		6.44 ± 0.81	6.51 ± 0.65	0.4
Neck circumference* (cm)		33.4 ± 3.96	32.3 ± 3.92	0.2
Mallampatti class	I (%)	35 (14)	42.5 (17)	0.5
	II (%)	65 (26)	57.5 (23)	
ASA Grade	I (%)	40 (16)	30 (12)	0.348
	II (%)	60 (24)	70 (28)	

*Expressed as mean standard deviation

in oxygen saturation between both the groups and were comparable.

In group A, the maximum sealing pressure was 35 cmH_2O and minimum sealing pressure was 15 cmH_2O. In group B, the maximum sealing pressure was 40 cmH_2O and the minimum sealing pressure was 17 cmH_2O. The mean sealing pressure was much higher in

group B (29.1 ± 5.13 cmH_2O) when compared to group A (24.6 ± 4.64 cmH_2O) and the difference was statistically very significant (p<0.001), as shown in Table 3, Figure 2. The average peak airway pressure after 5 minutes of successful insertion of SAD in group A and B were 16.8 ± 3.16 cmH_2O and 16.1 ± 2.75 cmH_2O respectively, with p value of 0.4 (Table 3). The mean plateau airway pressure after 5 minutes of successful insertion of SAD in group A and B were 13.8 ± 2.76 cmH2O and 12.3 ± 3.21 cmH2O respectively, with p value of 0.054 (Table 3).

Table 3: Assessment Parameters

Parameters		Group A	Group B	P value
Insertion Time (Secs)*		**14.1 ± 2.83**	**18.1 ± 4.24**	**<0.001**
Number of attempts (%)	1	92.5	80	
	2	7.5	20	0.105
	3	0	0	
Ease of insertion (%)	Easy	92.5	80	
	Difficult	7.5	20	0.105
	Very Difficult	0	0	
	Impossible	0	0	
Sealing Pressure (cm H_2O)*		24.6 ± 4.64	29.1 ± 5.13	<0.001
Airway pressures* (cmH_2O)	Peak airway pressure	16.8 ± 3.16	16.1 ± 2.75	0.4
	Plateau airway pressure	13.8 ± 2.76	12.3 ± 3.21	0.54

*Expressed as mean standard deviation

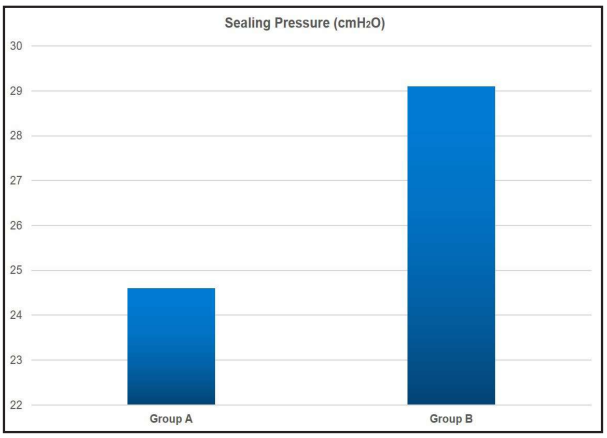

Figure 2: Sealing Pressure

Hence, peak and plateau airway pressures after 5 minutes of successful insertion of SAD did not differ significantly between both the groups and were comparable.

There were no occurrence of desaturation and displacement of the device in both the groups, intraoperatively. In comparison to group A, more number of patients in group B had cough (3 vs 6 patients) and sore throat (4 vs 7 patients) after removal of the device. But these differences were not statistically significant. None of the patients in both the groups had laryngospasm, breath holding, aspiration, hoarseness of voice and dysphagia postoperatively.

DISCUSSION

The discovery of SADs is considered to be an important milestone in anaesthesia management, in terms of better patient safety profile and lesser sympathetic response. In an attempt to compare the safety and efficacy between i-gel and Baska mask this prospective study was carried out.

In our study, both the groups did not differ significantly in terms of age, gender, weight, height and BMI. Similarly airway assessment parameters like inter-incisor distance, neck circumference, thyromental distance and mallampatti class were also comparable between both the groups. And also the patients of both the groups were similarly distributed among the ASA class I and II. Hence the demographic profile of both the groups were comparable with p values more than 0.05.

In our study, the mean time interval from the removal of facemask to the first square wave on capnogram after the optimal insertion of SAD was lesser in group A when compared

to group B (14.1 ± 2.83 seconds vs 18.1 ± 4.24 seconds, respectively) and the difference was highly significant (p<0.001). Thus the Baska mask takes a longer time for insertion when compared to i-gel. In a study by **Kara D et al,**[6] they had demonstrated that the median insertion time of Baska mask was higher when compared to i-gel (14 seconds vs 7 seconds, respectively) with p-value less than 0.001. **Sinasamy TK et al**[4] had also made similar observation in their study. The longer insertion time of the Baska mask could be because of its shape and morphology.

In all the patients of both the groups, the SADs were successfully inserted with the maximum of two attempts. The first attempt success ratewas slightly higher in group A (92.5%) when compared to group B (80%) and this difference was statistically insignificant (p=0.105). **Sachidananda et al**[7] and Kara D et al,[6] alsohad demonstrated in their studies that the first attempt success rate was slightly lesser in Baska group when compared to i-gel group and the difference was not statistically significant. **Sinasamy et al,**[4] had categorized ease of insertion based on 4 point verbal rating scale (very easy, easy, difficult, Fail) and had observed that 62.5% of patients in i-gel group had very easy category of insertion, but in Baska group only 10 % patients had very easy category of insertion and that was statistically highly significant. This contradiction could be because of the difference in the method of categorizing the ease of insertion. In our study the ease of insertion was categorized objectively based on the number of attempts but in the study by Sinasamy et al[4] it was categorized subjectively based on verbal rating scale.

In our study, there was no statistically significant difference was noted in hemodynamic parameters. Similarly, **Sachidananda** *et al.,*[7] in their study, also had recorded heart rate and mean arterial pressure for first 25 minutes after insertion and had observed that there were no significant difference in terms of heart rate and mean arterial pressure between both i-gel and Baska groups. This could be because of the similarity between i-gel and Baska mask in producing lesser sympathetic response during insertion.

In our study, the mean sealing pressure in group B was significantly higher when compared to group A (29.1 ± 5.13 cm H_2O vs 24.6 ± 4.64 cmH_2O, respectively) and the difference was statistically highly significant (p<0.001). Also, the maximum sealing pressure achieved was higher in group B when compared to group A (40 vs 35 cmH_2O, respectively). **Garg A *et al,***[8] in their study on comparing i-gel and Baska mask in patients undergoing short gynecological procedures, had concluded that the mean airway seal pressure of Baska mask was significantly higher when compared to i-gel (35.8 ± 10.3 cmH_2O vs 26.9 ± 7.5 cmH_2O, respectively). Sharma P *et al,*[9] in their study on patients undergoing laparoscopic cholecystectomy under general anaesthesia, also had found that the oropharyngeal sealing pressure measured immediately after insertion was significantly higher for Baska mask when compared to i-gel (31.16 ± 4.3 cmH_2O vs 28.27 ± 0.3.4 cmH_2O, respectively). Similarly, in a study by Sachidananda *et al,*[7] on patients undergoing minor surgical procedures,they had concluded that the mean sealing pressure of Baska mask was higher when compared to i-gel (28.9 ± 3.5 cmH_2O vs 25.9 ± 2.5 cmH_2O, respectively). Even Chaudhary UK et al[10] and Jain P et al[11] also had made a similar observation in their studies.This increased airway sealing pressure of Baska mask could be because of its non inflatable cuff, which is a membrane that autoinflates on each breath during IPPV. Hence, an increase in airway pressure significantly increase the cuff pressure and prevents air leak. On the contrary, i-gel lacks this feature and therefore the sealing pressure of i-gel is lesser.

Both the groups were comparable in terms of peak and plateau airway pressures measured at 5 minutes of successful insertion. The mean peak airway pressure in group A and group B were 16.8 ± 3.16cm H_2O and 16.1 ± 2.75 cm H_2O, respectively. The mean plateau airway pressure in group A and B were 13.8 ± 2.76 cm H_2O and 12.3 ± 3.21cm H_2O, respectively. The difference was not statistically significant. Similarly, in a study by **Sharma P et al,**[9] on comparing LMA Supreme, i-gel and Baska mask in patients undergoing laparoscopic cholecystectomy, they had found that the mean peak airway pressure at various time intervals were similar between the three groups and was statistically insignificant. Though the study by **Sinasamy et al,**[4] had revealed that the Baska mask group required more corrective manoeuvres intraoperatively, no such manoeuvres were

required in our study. Moreover no incidence of intraoperative desaturation was noted.

Though the incidence of cough and sore throat were marginally higher in group B when compared to group A, the difference was statistically insignificant. None of the patients in both the groups had other postoperative complications like laryngospasm, breath holding, pulmonary aspiration, hoarseness of voice and dysphagia. **Sachidananda et al,**[7] also had reported slightly higher occurrence of sore throat and cough in the Baska group when compared to i-gel group, but it was statistically insignificant. Also, similar observation had been made by **Chaudhary UK et al**[10] and **Jain P et al**[11] in their studies. Though statistically insignificant, this increased incidence of cough and sore throat among the Baska mask group patients could be because of the cuff morphology. On the contrary, **Kara D et al**, [6] in their study, had reported that the incidence of hoarseness (23% vs 4%) and dysphagia (7% vs 0%) were significantly higher in Baska group when compared to i-gel group after 1 hour of extubation. This could probably be attributed to the difference in smooth technique of insertion of the SAD, which is at times independent of the experience of the anaesthesiologist.

CONCLUSION

Though the i-gel was superior to Baska mask with shorter insertion time, it was comparable in terms of first attempt success rate, ease of insertion and postoperative complications. But the Baska mask showed its superiority to i-gel, in terms of better sealing pressure. Hence, Baska mask can be used as a good alternative SAD to i-gel in short surgical procedures requiring higher airway sealing pressure.

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REFERENCES

1. Kannaujia A., Srivastava U., Saraswat N., Mishra A., Kumar A., Saxena S. A Preliminary Study of I-Gel: A New Supraglottic Airway Device. Indian J Anaesth. 2009 Feb; 53(1): 52–56.
2. Alexiev V., Ochana A., Abdelrahman D., Coyne J., McDonnell J.G., O'Toole D.P. *et al.* Comparison of the Baska mask with the single-use laryngeal mask airway in low-risk female patients undergoing ambulatory surgery. Anaesthesia. 2013 Oct; 68(10): 1026-32.
3. Verma N., Nigam A., Singam A. Comparative Evaluation of Baska Mask and LMA Supreme in Patients Undergoing Short Surgical Procedures Under General Anaesthesia. Journal of Evolution of Medical and Dental Sciences.August 2020; 9(33): 2377-2380.
4. Sinasamy T.K., Hassan WMNW, Zaini R.H.M., Seevaunnamtum P., Mukmin L.A. Comparison of the Baska mask and the i-gel supraglottic airway devices in patients undergoing elective surgery. Anaesthesiol Intensive Ther. 2020; 52(5): 383-388.
5. Choi S.R., Lee T.Y., Kim S.W., Park S.Y., Chung C.J. *et al.* Comparison of clinical performance of i-gel and Baska Mask during laparoscopic cholecystectomy. Korean J Anesthesiol. 2019 Dec; 72(6): 576-582.
6. Kara D., Sarikas C.M. Comparison of the Baska and i-gel supraglottic airway devices: a randomized controlled study. Ann Saudi Med. September-October 2019; 39(5): 302-308.
7. Sachidananda R., Shaikh S.I., Mitragotri M.V., Joshi V., Ladhad D.A. *et al.* Comparison between the Baska Mask and i-gel for Minor Surgical Procedures Under General Anaesthesia. Turk J Anaesthesiol Reanim. 2019 Feb; 47(1): 24-30.
8. Garg A., Lamba N.S., Ajai Chandra NS, Singhal R.K., Chaudhary V. Supraglottic airway devices in short gynecological procedures: A randomized, clinical study comparing the Baska mask and i-gel device. J Family Med Prim Care. 2019 Mar; 8(3): 1134-1137.
9. Sharma P., Rai S., Tripathi M., Malviya D., Kumari S. *et al.* Comparison of LMA Supreme, i-gel, and Baska Mask for Airway Management during Laparoscopic Cholecystectomy: A Prospective Randomized Comparative Study from North India. Anesth Essays Res. 2022 Jan-Mar; 16(1): 42-48.
10. Chaudhary U.K., Mahajan S.R., Mahajan M., Sharma C., Sharma M. A Comparative Analysis of the Baska Mask Versus i-gel for General Anesthesia in Surgical Patients Undergoing Laparoscopic Cholecystectomy. Acta Medica International. 2018 Jul-Dec; 5(2): pp. 69-73.

11. Jain P., Sharma U., Modi Y.C., Morwal S.K. Comparison of Baska Mask Versus i-gel in Short Gynaecological Laparoscopic Surgeries Under General Anaesthesia in Adult Female: A Randomized Interventional Study. Archives of Anesthesiology and Critical Care (Autumn 2023); 9(4): 310-314.