Introduction
Prolactinoma is most common functioning pituitary adenoma (50%). It occurs most frequently among women aged 20 to 50 years There have been limited studies for prolactinoma in adolescents. Pituitary adenomas is uncommon in childhood and adolescence. However, there have been limited studies for prolactinoma in adolescents. Pituitary adenomas are uncommon in childhood and adolescence (<3% of childhood supratentorial tumors, 3-6% of all surgically treated adenomas).

The aim of this study is assess the characteristics of Korean adolescents with prolactinoma and their clinical course.

Patients and methods
This study is retrospective cohort study. Patients diagnosed with prolactinoma (age <19 years) in Samsung Medical Center during a 13-year period (2005-2017). Study subjects are total 25 patients (20 female/5 male). The median age is 16.9, ranged from 10.1 to 18.5, divided into two groups according to tumor size and surgery-done (Surgery group, n=14 vs. non-surgery group, n=11). There are 11 microadenomas and 14 macroadenomas. Factors related to tumor size were evaluated.

Statistical analysis
The results are presented as the mean (SD) or mean change (SD). For categorical variables, we used Student’s t test, and for continuous variables, we used Wilcoxon-Mann-Whitney test. The relationship of each risk factor with macroprolactinoma was defined by logistic regression analysis. Correlations between microprolactinoma and other variables were determined by Spearman rank order correlation. All statistical analysis was performed using SPSS Statistics 24 (IBM Corporation, USA)

Results
The most common clinical manifestations are galactorrhea (40%), amenorrhea (36%), visual field defect (16%), and headache (12%). Serum prolactin (PRL) levels at diagnosis is 72 to 10,000 ng/mL. Tumor size at diagnosis is 4 to 74 mm. Mean immediate postoperative decline rate in PRL level is 93.5%. Baseline characteristics of the patients are in Table 1. Mean age at diagnosis is 16.9 (range 16.3-18.0). The follow-up period is 2.0 yr. Mean age at diagnosis did not differ between boys (14.8 ± 3.3 yr; range 10.1-18.2 yr) and girls (16.9 ± 1.3 yr; range 13.4 - 18.5 yr) (p = 0.243). Clinical and biochemical presentation of the microadenomas and macroadenomas subgroups are in Table 2. Prolactin level at diagnosis was significantly higher in macroadenoma group (516 vs 114.2 ng/mL, p < 0.001). Patient diagnosed to panhypopituitarism was 1 (9%) in microadenoma patients, 10 (71%) in macroadenoma patients (p = 0.008). Operation was done in two patients (18%) in microadenomas, twelve (86%) in macroadenomas (p = 0.003). Male gender, Prolactin level at diagnosis, and immediate postoperative PRL level were positively correlated with maximal tumor diameter (r = 0.443, p = 0.026; r = 0.710, p < 0.001; r = 0.623, p = 0.001). Comparison of clinical and laboratory parameters in the surgery and non-surgery groups are in Table 3. Maximal tumor diameter and PRL level at diagnosis were significantly higher in surgery group in comparison with non-surgery group (p = 0.001, p = 0.013, respectively).

Conclusions
Macroprolactinoma is more prevalent in adolescents than adults. In adolescents with prolactinoma, girl is more prevalent, boys usually present with mass effect symptoms from macroprolactinoma. Male gender is in higher risk for macroadenoma more than female in adolescents with prolactinoma. Macroprolactinoma usually presents with panhypopituitarism. Given that diagnosis and prognosis may vary depending on the gender, we need to consider a more aggressive treatment in males. In addition, cocktail test for adolescents with prolactinoma is essential and adjunctive hormone replacement is important to improve their quality of life.