INTRODUCTION

Hyperparathyroidism, a condition with elevated parathyroid hormone (PTH) levels can occur as primary hyperparathyroidism, which is either caused by adenoma of one or more parathyroid glands or hyperplasia of all four parathyroid glands. It can also occur as secondary hyperparathyroidism, which may be due to Vitamin D deficiency or uremia. Hyperparathyroidism is identified in 1 in every 500 women and 1 in every 2000 men older than the age of 40.

Primary hyperparathyroidism is a clinical condition caused when the parathyroid glands overproduce parathyroid hormone. Diagnosable by the presence of hypercalcemia with an inappropriately normal or elevated level of parathyroid hormone. This clinicality is now considered the most common cause of hypercalcemia in the outpatientsetting. Bone pain, fatigue, mood swings are some common symptoms of hyperparathyroidism. However, more than 90% patients that have been labeled “asymptomatic” have presented with significant symptoms that are likely related to hyperparathyroidism since many of its symptoms are nonspecific and cannot be quantified with ease.

Secondary hyperparathyroidism is a problem that has often been experienced during the management of patients with chronic kidney disease (CKD).

Traditionally, severe bone pain, general weakness, pruritus and extensive soft tissue calcification are red flags for Parathyroidectomy in secondary hyperparathyroidism. An increase in the levels of Parathyroid hormone (PTH) are seen with the progression of CKD when the eGFR falls to approximately 45 ml/min per 1.73m². On transition to maintenance dialysis therapy, almost all the patients are seen to have secondary hyperparathyroidism.

Cheng highlighted that the symptom burden of secondary hyperparathyroidism has affected patient quality of life negatively and Para thyroidectomy has been associated with a noticeable improvement in the symptoms and quality of life. Despite the apparent advances in the field of endocrinology, the treatment of hyperparathyroidism remains a challenge for clinicians.

Chou et al. revealed that Para thyroidectomy and auto transplantation improved the bone mineral density of secondary hyperparathyroidism. Authors commented that after 7 days of surgery, a decrease in calcium and parathyroid hormone was observed. Furthermore, after six months of operation, BMD increased significantly (p<0.001).

Due to limited local research and the dire need of data on management and outcome of hyperparathyroidism postoperatively, the current study was undertaken.

The study aimed to evaluate the cases of hyperparathyroidism, both primary and secondary, and assess pain relief as an indicator of recovery.

METHODS AND MATERIALS

A prospective, comparative study was conducted at the Department of Surgery, Jinnah Postgraduate Medical Center, between March 2022 and August 2022. After obtaining the ethical approval from the institutional review board, the data acquisition was initiated. All patients with increased intact parathyroid hormone and elevated levels of calcium on presentation were included in the study. Patients were classified as primary hyperparathyroidism when the MIBI scan detected an adenoma with clinical features of hypercalcemia and increased PTH whereas, patients were diagnosed with secondary hyperparathyroidism if patient presented with renal failure, persistently high levels of PTH, as well as hypocalcemia. Secondary hyperparathyroidism was defined as persistently high PTH level (normal PTH =65 pg/ml).

All patients with primary hyperparathyroidism underwent excision for adenoma while patients with secondary hyperparathyroidism underwent total parathyroidectomy and auto-
transplantation. Visual analogue scale was used to assess bone pain at presentation and 1-day after procedure, and then six-weeks at follow-up. Change in symptomatology was observed and compared between the two sets of patients. SPSS was used to analyze the data. All quantitative data were presented with mean and standard deviation including the mean calcium and PTH levels. All categorical variables were presented as frequency and proportions.

RESULTS
The mean calcium levels of patients with primary parathyroidectomy was 13.5mg/dL.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Primary Hyperparathyroidism (n=14)</th>
<th>Hyperparathyroidism Secondary (n=4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium mg/dL</td>
<td>13.5</td>
<td>7.5</td>
</tr>
<tr>
<td>PTH pg/ml</td>
<td>2650</td>
<td></td>
</tr>
<tr>
<td>Adenoma size (cm)</td>
<td>2.5(1.4)</td>
<td></td>
</tr>
<tr>
<td>Adenoma</td>
<td>Yes</td>
<td>1 (25%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Bone pain</td>
<td>Yes</td>
<td>13 (92.8%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1 (7.2%)</td>
</tr>
<tr>
<td>Renal stone</td>
<td>Yes</td>
<td>4 (28.6%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10 (71.4%)</td>
</tr>
<tr>
<td>Depression</td>
<td>Yes</td>
<td>4 (28.6%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10 (71.4%)</td>
</tr>
<tr>
<td>Duration of Hypocalcemia (days)</td>
<td>-</td>
<td>9 (5-14)</td>
</tr>
<tr>
<td>Surgery</td>
<td>Yes</td>
<td>14 (100%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

A total of fourteen primary hyperparathyroidism cases were observed in our center. A 30 year old male patient presented with multiple fractures, a history of surgeries for recurrent kidney stones, who was bedridden on admission. Baseline calcium and parathyroid levels were 13mg/dL and 2650pg/ml. The patient was eventually diagnosed as a case of adenoma, subsequently underwent surgical excision. Postoperative PTH levels reduced to 850pg/ml. After seven weeks, the patient was relieved of the bone pain. Thirteen patients presented with bone pain and deformity, three of these patients were operated for renal stones, three patients had depressive symptoms. The calcium ranged from 12-16 with adenoma ranging from 1.0cm to 4.0cm. In all these 13 patients, MIBI scan showed adenoma after which these patients underwent.

Three cases were diagnosed as secondary hyperparathyroidism, secondary to renal failure. Total parathyroidectomy was done to remove all four parathyroid glands with subsequent autotransplant. All patients had hypocalcemic signs, which was relieved after surgery.

One patient presented with renal failure, diagnosed with adenoma. However, the patient did not respond to surgery and underwent recurrent surgery for second enlargement of gland on the contralateral side that was missed on imaging. All four glands were excised. Bone pain was relieved after surgery.

DISCUSSION
Silveira et al. in their study found Para thy secondary hyperparathyroidism. The authors also discussed that in patients diagnosed with renal hyperthyroidism who underwent Para thyroidectomy, using parathyroid hormone during the procedure helped to assume an earlier therapeutic outcome which was both specific and sensitive.

McCaw et al in their review discussed hyperparathyroidism to lead to lower quality of life and also to increase the risk of osteoporosis along with kidney stones and cardiovascular disease. Silverberg et al. in a 10-year study found hyperparathyroidism patients having high levels of bone mineral density of femoral neck and lumbar spine with improvements in 1 year after surgery. Patients not undergoing surgery were however found by the authors to have no improvement whatsoever in bone mineral density along with progression of disease (10%). Other studies such as Sekar et al. found that patients could be discharged without giving calcium supplementation after thyroids as a calcium and PTH based protocol can be efficiently used in these patients. Dahsay et al. discussed that focused surgery should be the main management plan in sporadic Para thyroidectomy even if intraoperative parathormone is not available after the gland has been localized post surgery to avoid complications due to surgery leading to a low recurrence rate. The authors also saw a decrease in the serum calcium (11.9±1.76mg%) to 9.11±0.87mg%) and average PTH (608 ± 673.6 pg/ml to 32.05 pg/ml (IQR 15.71, 54.54) after focused Para thyroidectomy which was consistent with our study. Elhenfy et al. however looked at early predicting factors of hypocalcemia post total thyroidectomy and while Calcium (9mg/dL to 8.4mg/dL) and Phosphate levels (40.5pg/ml to 25.3pg/ml) postoperatively) were decreased (p<0.001), PTH levels were found to be more specific and sensitive to early detection of hypocalcemia. This was similar to an earlier study by Asari et al where the authors found that measuring intact PTH levels along with serum Calcium levels within 24 hours of total thyroidectomy helps in predicting hypercalcemia owing to higher specificity, sensitivity and positive predictive value of intact PTH. However in a study conducted by Yadav et al. the authors could not prove the accuracy of intraoperative parathormone to have any significant effect on the outcome of surgery while comparing conventional surgery with focused surgery, conventional surgery (7.6%) was also seen with more complications as compared to focused surgery (3.6%) (p<0.001).

One limitation of our study is that since it is a rare disease we were not able to find enough cases to compare our study findings with. Further large scale studies are warranted.

CONCLUSION
In all patients, irrespective of the cause of the hyperparathyroidism, pain relief was correlated with recovery from signs and symptoms of illness.

Conflict of interest: Nil

REFERENCES