INTRODUCTION & PURPOSE

- Visual Evoked Potentials (VEP) play a role for assessing visual sense and/or diagnosing visual impairment caused by post-retinal disorders in human. During the years since the first description of canine VEP in 1968, there have not been many reports.

- We recorded Flash VEP (f-VEP) to investigate influence of mydriasis, the differences of stimulated sides of eye, and reproducibility, in healthy beagles, and to evaluate f-VEP as a visual examination in cases. And we considered the suitable method for dogs.

MATERIALS AND METHODS

Animals

- Normal Group: 7 normal beagles (6 males and 1 female, 6 to 7-year-old)
- Disease Group: 4 cases with visual impairment

f-VEP recording

- f-VEP was recorded with portable VEP system (LE-3000, Tomey Corp., Nagoya, Japan), including amplifier, recorder and flash VEP stimulator, using the following stimulus conditions;
- Plate-type electrodes were positioned at inion, nasion and temporal region.
- All dogs were sedated with a combination of medetomidine (0.01 mg/kg), midazolam (0.015 mg/kg) and butorphanol (0.025 mg/kg) intravenously.
- Combination-drops of 0.5% tropicamide and 0.5% phenylephrine hydrochloride are used for mydriasis.

TABLE 1. STIMULUS SETTING FOR f-VEP

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Frequency</th>
<th>Repetition</th>
<th>Length to Cornea</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 cd/s/m²</td>
<td>2 Hz</td>
<td>128 times</td>
<td>2 cm</td>
</tr>
<tr>
<td>(3000 cd/m² x 1 msec)</td>
<td></td>
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</tbody>
</table>

Figure 1. Positions of electrodes

- : Recording electrode on inion
- : Reference electrode on nasion
- : Ground electrode on temporal

Figure 2. LED Built-in flash VEP Stimulator

RESULTS

Table 2. Data of f-VEP in Normal Group (n = 14 eyes)

<table>
<thead>
<tr>
<th></th>
<th>Implicit time (msec)</th>
<th>Amplitude (µV)</th>
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<tbody>
<tr>
<td></td>
<td>N2</td>
<td>P2</td>
</tr>
<tr>
<td>Before mydriasis</td>
<td>49.2 ± 12.1</td>
<td>98.5 ± 11.7</td>
</tr>
<tr>
<td>After mydriasis</td>
<td>33.5 ± 8.4</td>
<td>79.7 ± 16.0</td>
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Differences of stimulated sides of eye

<table>
<thead>
<tr>
<th></th>
<th>Right</th>
<th>Left</th>
</tr>
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<tbody>
<tr>
<td>Before mydriasis</td>
<td>51.3 ± 12.8</td>
<td>100.4 ± 12.4</td>
</tr>
<tr>
<td>After mydriasis</td>
<td>47.1 ± 14.0</td>
<td>97.8 ± 13.1</td>
</tr>
</tbody>
</table>

Reproducibility

- 1st recording: 33.5 ± 8.4, 79.7 ± 16.0, 9.6 ± 3.3
- 2nd recording: 36.7 ± 11.4, 77.6 ± 14.5, 7.2 ± 4.1

Case 1. Cataract - Jack Russell Terrier, 7-year-old, Male

- OD OS
- PLR (OD): + / +, P2 (ID): + / +
- Menace: +, -
- Dazzle: +, -
- Etc.: ERG was recorded

Case 2. Optic Nerve Atrophy - Cavalier King Charles Spaniel, 7-year-old, Male

- OD OS
- PLR (OD): - / -, P2 (ID): + / -
- Menace: -
- Dazzle: -
- Etc.: ERG was recorded

Case 3. Chronic Glaucoma - American Cocker Spaniel, 6-year-old, Male

- OD OS
- PLR (OD): - / -, P2 (ID): + / -
- Menace: -
- Dazzle: -
- IOP (mmHg): 44, 16
- Etc.: Normal Fundus

Case 4. Brain Tumor - Chihuahua, 7-year-old, Female

- OD OS
- PLR (OD): - / -
- Menace: -
- Dazzle: -
- Etc.: ERG was recorded

CONCLUSIONS

- Pupil size influences f-VEP components, implicit times and amplitude. And our results indicated reproducibility of implicit times.

- f-VEP could not be recorded from dogs with disorder regarded in post-retinal.

- f-VEP is useful to objective their vision in clinical cases.