Q

- Patients with a PDA are at increased risk of ROP
A

- Patients with a PDA are at increased risk of ROP **True**
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Why would a Personal Digital Assistant put someone at increased risk of ROP?
In this context, PDA stands for patent ductus arteriosus.
Patients with a **PDA** are at increased risk of ROP. True

Why would a Personal Digital Assistant put someone at increased risk of ROP? In this context, PDA stands for **patent ductus arteriosus**
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- Patients with a PDA are at increased risk of ROP True
- Birth weight is a greater predictor for ROP than O₂ exposure True; LBW is #1 risk factor
- Exposure to ambient light has a small but significant effect on ROP development False; the Light-ROP study found no relationship
- Infants with a R → L cardiac shunt (and subsequent low O₂ sat) are protected from ROP False, and this provides strong evidence that excess PaO₂ is not causative
- Whites have a greater risk of ROP than blacks True
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**ROP: True or false**

(low birth weight)
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<td>&lt;750</td>
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- **轻度氧中毒**
- **中度氧中毒**
- **重度氧中毒**

**ROP: True or false**

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Note the pattern...
Q

- Patients with a PDA are at increased risk of ROP True
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OK, but which variable is the best predictor of when an infant will develop significant ROP?
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**ROP: True or false**

OK, but which variable is the best predictor of when an infant will develop significant ROP? Infant age

Can you be more specific? That is, which age is the best predictor--postmenstrual, gestational or chronologic? (And what are these different ages anyway?)
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Can you be more specific? That is, which age is the best predictor--postmenstrual, gestational or chronologic? (And what are these different ages anyway?)
Development of significant ROP correlates best with the infant’s postmenstrual age. Postmenstrual age equals gestational age at birth + chronologic (postnatal) age. Research indicates that infants rarely develop significant ROP before postmenstrual age 31 weeks. Thus, screening exams before this age have very low yield, and needlessly stress the infant.
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What does this indicate about the relationship between timing of ROP development and an infant’s chronologic age?
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What does this indicate about the relationship between timing of ROP development and an infant’s chronologic age? It indicates that younger preemies take longer to develop significant ROP than do older preemies. Consider two infants, one born at a gestational age 24 weeks, the other at 27. Neither is expected to develop ROP before postmenstrual age 31 weeks. Thus, the 24-weeker needs to be examined at chronologic age 7 weeks (24+7=31), whereas the 27-weeker should be examined at chronologic age 4 weeks (27+4=31). (We’ll have more to say about ROP screening, and its timing, shortly.)
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What does the term Everest in utero have to do with ROP?
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What does the term *Everest in utero* have to do with ROP?
The term highlights the fact that the gestational environment is profoundly hypoxic compared to life ex utero. Oxygen levels in utero are about what they are at the 26,000 ft level on Everest—the so-called ‘death zone.’ It is under these $O_2$ conditions that the retinal vasculature is supposed to develop.
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What does this suggest about premature birth and the pathophysiology of ROP?
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**What does this suggest about premature birth and the pathophysiology of ROP?**

When the preemie experiences normal ex utero $O_2$ levels, further development of the retinal vasculature is suppressed. This leaves more peripheral retinal areas with inadequate oxygenation. As they mature, these hypoxic retinal cells do what hypoxic retinal cells tend to do—they produce VEGF. The result is the now-familiar cascade of neovascularization, bleeding, and tractional retinal detachment.
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ROP: True or false

In other words, ROP is a biphasic disease:

(What happens first?)

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In other words, ROP is a biphasic disease:
-- First, premature birth (+/- supplemental O2) exposes the immature retina to vastly higher-than-normal O2 levels, leading to downregulation of VEGF. This causes the immature retinal vascular tree to stop proliferating.

(What happens later?)

strong evidence that excess PaO2 is not causative

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In other words, ROP is a **biphasic disease**:

--First, premature birth (+/- supplemental \( O_2 \)) exposes the immature retina to vastly higher-than-normal \( O_2 \) levels, leading to **downregulation of VEGF**. This causes the immature retinal vascular tree to **stop proliferating**.

--Later, the (unvascularized) peripheral retina becomes metabolically active. The lack of vascularization renders the peripheral retina hypoxic, leading to **upregulation of VEGF**. This causes the vascular tree to **start proliferating again**.

What does the term **Everest in utero** have to do with ROP?
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• **ROP classification**: Based on pathology location, appearance, and disease status:

  - **Location**
    - Zone 1: Circle around ONH with radius 2x disc-fovea distance
    - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
    - Zone 3: Residual crescent anterior to Zone 2

  - **Appearance**
    - Stage 1: Demarcation line
    - Stage 2: Elevated line ('ridge') +/- small tufts of neo
    - Stage 3: Ridge with extensive neo growing through ILM
    - Stage 4: Subtotal RD
    - Stage 5: Total RD
ROP classification: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:
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(ONH = optic nerve head)
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  ![Diagram of zones](image-url)
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![Diagram of ROP classification zones](image-url)
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    - Stage 1: Demarcation line
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    - Stage 3
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(neo = short for ‘neovascularization’)
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- **Stage 3**: Ridge with extensive neo growing through ILM
- **Stage 4**: Subtotal RD
- **Stage 5**: Total RD
ROP classification: Based on pathology location, appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line ('ridge') +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4
  - Stage 5

(ILM = internal limiting membrane)
**ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: [Blank]
  - **Stage 5**
**ROP classification**: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: (RD = retinal detachment)
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
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- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5

Stage 4 is divided into two substages:
4a: RD with macula…
4b: RD with macula…
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

- **Appearance**
  - Stage 1: Demarcation line
  - Stage 2: Elevated line (‘ridge’) +/- small tufts of neo
  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5

Stage 4 is divided into two substages:
- 4a: RD with macula…on
- 4b: RD with macula…off
**ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:

**Location**
- **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
- **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
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**Appearance**
- **Stage 1**: Demarcation line
- **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
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ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

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  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
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- **Appearance**
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- **Appearance**
  - Stage 1: Demarcation line
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  - Stage 3: Ridge with extensive neo growing through ILM
  - Stage 4: Subtotal RD
  - Stage 5: **Total RD**

What description is usually applied to the Stage 5 total RD?
**ROP classification**: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
  - **Zone 3**: Residual crescent anterior to Zone 2

- **Appearance**
  - **Stage 1**: Demarcation line
  - **Stage 2**: Elevated line (‘ridge’) +/- small tufts of neo
  - **Stage 3**: Ridge with extensive neo growing through ILM
  - **Stage 4**: Subtotal RD
  - **Stage 5**: **Total RD**

What description is usually applied to the Stage 5 total RD? It is described as a ‘funnel’ RD
ROP classification: Based on pathology (location), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
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- **Appearance**
  - Stage 1: Demarcation line
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  - Stage 4: Subtotal RD
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What are the three basic types of retinal detachment (generally speaking; not specific to ROP)?

Rhegmatogenous, exudative and tractional

Which sort of RD occurs in ROP?

Tractional RD (TRD)
• **ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:
  
  **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
  - Zone 2: Edge of Zone 1 to nasal ora, and around temporally
  - Zone 3: Residual crescent anterior to Zone 2

  **Appearance**
  - **Stage 1**: Demarcation line
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- **Presence/absence of plus disease**
  - *Plus* disease = dilated/tortuous retinal vessels
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

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How dilated/tortuous do the vessels need to be to qualify as plus disease?
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- **Presence/absence of plus disease**
  - **Plus** disease = Dilated/tortuous retinal vessels

How dilated/tortuous do the vessels need to be to qualify as plus disease? A standardized photo exists indicating the ‘official’ amount needed.
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

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- **Presence/absence of plus disease**
  - *Plus disease* = Dilated/tortuous retinal vessels

*How dilated/tortuous do the vessels need to be to qualify as plus disease?*
*A standardized photo exists indicating the ‘official’ amount needed*

*What if the vessels are definitely dilated/tortuous, but not to the extent indicated in the standardized photo? This is referred to as Pre-Plus disease*
ROP classification: Based on pathology **location** (zone), **appearance** (stage), and **plus disease** status:

- **Location**
  - **Zone 1**: Circle around ONH w/ radius 2x disc-fovea distance
  - **Zone 2**: Edge of Zone 1 to nasal ora, and around temporally
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- **Appearance**
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  - **Stage 4**: Subtotal RD
  - **Stage 5**: Total RD

- **Presence/absence of plus disease**
  - *Plus* disease = **Dilated/tortuous** retinal vessels
    - Indicates **two different words** is taking place
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
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- **Presence/absence of plus disease**
  - *Plus* disease = Dilated/tortuous retinal vessels
    - Indicates arteriovenous shunting is taking place
ROP classification: Based on pathology location (zone), appearance (stage), and plus disease status:

- **Location**
  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
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- **Presence/absence of plus disease**
  - Plus disease = Dilated/tortuous retinal vessels
    - Indicates arteriovenous shunting is taking place
    - Strong indicator that disease progression is occurring
**ROP classification**: Based on pathology location (zone), appearance (stage), and plus disease status:

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  - Zone 1: Circle around ONH w/ radius 2x disc-fovea distance
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  - *Plus* disease = Dilated/tortuous retinal vessels
    - Indicates arteriovenous shunting is taking place
    - Strong indicator that disease progression is occurring
● This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):
  ● 5 contiguous clock hours or 8 noncontiguous hours of *Stage 3* disease (or worse) in Zone I or II, associated with *plus disease*
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*What was the name of the study from which these (now considered outdated) treatment guidelines were developed?*
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

*What was the name of the study from which these (now considered outdated) treatment guidelines were developed?*

The **CRYO-ROP** study
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

*What’s wrong with these criteria for treatment? Why don’t we use them anymore?*
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

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*What are the new criteria?*

Treatment is indicated if the ROP meets one of three criteria:

1. 
2. 
3. 
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*What are the new criteria?*
Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
   or
2. Zone 1, Stage 3, with or without Plus disease
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1. Zone 1, any Stage, with Plus disease
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*What was the name of the study from which these treatment guidelines were developed?*
ROP: Treatment Considerations

This is the outdated definition of when to treat ROP (so-called Threshold disease):
- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

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What are the new criteria?
Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

What was the name of the study from which these treatment guidelines were developed? The ET-ROP (Early Treatment of Retinopathy of Prematurity) study
This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease.

The motivating factor behind the ET-ROP was to see whether earlier intervention could improve upon these dismal results.

What’s wrong with these criteria for treatment? Why don’t we use them anymore? Research indicated that less than 13% of children treated via these criteria went on to have 20/40 or better vision in treated eyes! That’s not a very good outcome, so these criteria have been revised.

What are the new criteria? Treatment is indicated if the ROP meets one of three criteria:

1. Zone 1, any Stage, with Plus disease (‘Rush disease’)
or
2. Zone 1, Stage 3, with or without Plus disease 
or
3. Zone 2, Stage 2 or 3, with Plus disease

What was the name of the study from which these treatment guidelines were developed? The ET-ROP (Early Treatment of Retinopathy of Prematurity) study.
This is the outdated definition of when to treat ROP (so-called Threshold disease):

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1. Zone 1, any Stage, with Plus disease
2. Zone 1, Stage 3, with or without Plus disease
3. Zone 2, Stage 2 or 3, with Plus disease

Per the ET-ROP, disease meeting these criteria are known as what 'type' of ROP?
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Per the ET-ROP, disease meeting these criteria are known as what 'type' of ROP?
Type I
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):

- **5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease**

Note that disease meeting ET-ROP criteria for treatment would not have met threshold under CRYO-ROP criteria. For this reason, the new criteria are sometimes referred to as ‘*pre-threshold Type I ROP*’

**What are the new criteria?**

**Treatment is indicated if the ROP meets one of three criteria:**

1. Zone 1, any Stage, with Plus disease or
2. Zone 1, Stage 3, with or without Plus disease or
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Per the ET-ROP, disease meeting these criteria are known as what ‘type’ of ROP? Type I
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This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

By what special name is ‘Zone 1 + Plus disease’ known?

Rush disease

Why is it called Rush disease?

Because these eyes are at especially high risk of very rapid progression to TRD

Which infants are at particular risk for developing Rush disease?

Those weighing under 1000 grams
This is the *outdated* definition of when to treat ROP (so-called *Threshold disease*):
- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

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**ROP: Treatment Considerations**

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By what special name is ‘Zone 1 + Plus disease’ known? Rush disease

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Why is it called Rush disease? Because these eyes are at especially high risk of very rapid progression to TRD

Which infants are at particular risk for developing Rush disease? Those weighing under 1000 grams

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A/Q

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As result, which is preferred, cryo or laser? No more cryo, just laser.

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Although it must be stressed that laser treatment is not wholly benign--issues with intra-operative apnea and/or adverse cardiac events have been reported, as have sequelae including cataract and glaucoma.

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ROP: Treatment Considerations

Another term is used for aggressive posterior ROP--what is it? It is called Aggressive Posterior ROP (APROP)

Is APROP simply another name for Rush disease? While the terms are sometimes used interchangeably, the clinical appearance and behavior of APROP can differ from that of Rush dz. APROP is characterized by the presence of neovascular fronds lying flat on the retinal surface (ie, without a ridge) in Zone 1 or posterior Zone 2. Active A-V shunting is the rule. APROP is notorious for four unfortunate tendencies:

1) Progressing directly from Stage 1 to Stage 3 disease;
2) very rapid progression--Stage 1 to 3 (or even 4) in a matter of days;
3) a proclivity to recur despite seemingly adequate treatment; and
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Recall this info from a previous slide

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**--Length of follow-up**

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Recurrences after CLT always occur at the ridge where neovascularization first occurred. However, some cases of post-bevacizumab recurrence develop at new locations well anterior to the original ridgeline. It is speculated that the location of these recurrences demarcate regions of retina for which ischemia (and VEGF production) outlasted the presence of therapeutic levels of bevacizumab in the eye.

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**ROP: Treatment Considerations**

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What clinical trial evaluated intravitreal bevacizumab as a primary treatment for ROP?

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**Safety.** The BEAT-ROP was not powered to detect safety issues. There were a total of six participant deaths during the trial--five in the bevacizumab arm and one in the CLT. This difference did not reach statistical significance (but again, the study was underpowered in this respect).

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ROP: Treatment Considerations

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This is the outdated definition of when to treat ROP (so-called Threshold disease):

- 5 contiguous clock hours or 8 noncontiguous hours of Stage 3 disease (or worse) in Zone I or II, associated with plus disease

What is the conventional treatment for ROP?

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ROP: Treatment Considerations

A

So that’s it then—bevacizumab is the tx of choice for Zone 1 APROP, right? Not quite. There are a host of criticisms of the BEAT-ROP trial specifically, as well as concerns regarding the use of intravitreal bevacizumab in infants generally.

Systemic effects. As of this writing, there are no data describing 1) how much of the intravitreal bevacizumab ‘escapes’ into the systemic circulation, 2) the extent to which systemic VEGF levels are affected, or 3) what effect (if any) the systemic bevacizumab has on developing organ systems. For example: Of the five infants in the bevacizumab treatment arm of the BEAT-ROP who died, four died of lung complications. Animal-model studies of VEGF’s role in organogenesis indicate it plays a role in development of the pulmonary vascular tree and alveoli. Is there a causal connection here? No one knows. (The BEAT-ROP researchers are currently gathering long-term follow-up data including looking for systemic developmental effects.)

On the other hand, there is no reason to think CLT has any long-term effects outside the eye. Intravitreal bevacizumab was only 3%.

What about in eyes with posterior Zone 2 APROP? The recurrence rates did not differ statistically

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What if the pt develops a TRD--how is that managed?

PPV and/or scleral buckle. Is it effective? Not so much. Only 30% of cases achieve anatomic reattachment; of these, only 25% are still attached at 5 years, and only 10% have ambulatory vision.
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*(PPV = Pars plana vitrectomy)*
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Once a decision to treat has been made, how long can it be deferred?

When possible, treatment should be initiated within 72 hours.
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ROP: Treatment Considerations

1. Zone 1, any Stage, with Plus disease
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   or
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**ROP screening**

- **Who?**
  - Screen all infants...
    - …with a birth weight of less than # gm
ROP screening

Who?

Screen all infants…

• ...with a birth weight of less than 1500 gm
**ROP screening**

***Who?***

- Screen all infants...
  - ...with a birth weight of less than 1500 gm, *and/or*
  - ...whose gestational age at birth was # weeks or less
**ROP screening**

**Who?**

- Screen all infants…
  - …with a birth weight of less than 1500 gm, **and/or**
  - …whose gestational age at birth was **30** weeks or less
ROP screening

Who?

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What about infants >1500 gm and/or with gestational age >30 weeks? Should they be screened?
ROP screening

Who?

- Screen all infants...
  - ...with a birth weight of less than 1500 gm, and/or
  - ...whose gestational age at birth was 30 weeks or less

What about infants >1500 gm and/or with gestational age >30 weeks? Should they be screened? Not as a general rule. However, the guidelines state that such infants should be screened if/when their neonatologist feels it is indicated.
**ROP screening**

**Who?**
- Screen all infants...
  - ...with a birth weight of less than 1500 gm, *and/or*
  - ...whose gestational age at birth was 30 weeks or less

**When?**
- Timing of first screen is a function of pt
ROP screening

Who?
• Screen all infants:
  ▪ …with a birth weight of less than 1500 gm,
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When?
• Timing of first screen is a function of pt age (see table)

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### Table: ROP: Screening and Follow-Up

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### First-screen timing in a nutshell:
- If the infant's gestational age at birth was 27 weeks or younger, perform first screen at postmenstrual age 31 weeks,
- If the infant's gestational age at birth was 28 weeks or older, perform first screen at chronologic age 4 weeks

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Don’t try and memorize the table! Instead, here is first-screen timing in a nutshell:
**ROP screening**

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</table>

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Don't try and memorize the table! Instead, here is first-screen timing in a nutshell:
If the infant's gestational age at birth was 27 weeks or younger, perform first screen at postmenstrual age 31 weeks, or...
### ROP screening

#### Who?
- Screen all infants...
  - ...with a birth weight of less than 1500 gm,
  - ...whose gestational age at birth was 30 weeks or less

#### When?
- Timing of first screen is a function of pt age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

#### How Often?
- A single screening exam is sufficient if the retina is fully vascularized OU
  - Otherwise, 1 - 3 week follow-up is indicated (depending upon exam findings)

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**ROP: Screening and Follow-Up**

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Postmenstrual age</th>
<th>Chronologic age at time of first ROP screening</th>
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</tr>
</tbody>
</table>

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*Don’t try and memorize the table! Instead, here is first-screen timing in a nutshell:*

If the infant’s gestational age at birth was 27 weeks or younger, perform first screen at **postmenstrual age 31 weeks,**

or

If the infant’s gestational age at birth was 28 weeks or older, perform first screen at **chronologic age 4 weeks**
**ROP screening**

**Who?**
- Screen all infants…
  - …with a birth weight of less than 1500 gm, and/or
  - …whose gestational age at birth was 30 weeks or less

**When?**
- Timing of first screen is a function of pt age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

**How Often?**
- A single screening exam is sufficient if the retina is...
**ROP screening**

- **Who?**
  - Screen all infants...
    - ...with a birth weight of less than 1500 gm, and/or
    - ...whose gestational age at birth was 30 weeks or less

- **When?**
  - Timing of first screen is a function of pt age (see table)
    - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

- **How Often?**
  - A single screening exam is sufficient if the retina is fully vascularized OU
**ROP screening**

**Who?**
- Screen all infants…
  - …with a birth weight of less than 1500 gm, and/or
  - …whose gestational age at birth was 30 weeks or less

**When?**
- Timing of first screen is a function of pt age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

**How Often?**
- A single screening exam is sufficient if the retina is fully vascularized OU
- Otherwise, follow-up is indicated (depending upon exam findings)
ROP screening

Who?
- Screen all infants...
  - ...with a birth weight of less than 1500 gm, and/or
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When?
- Timing of first screen is a function of pt age (see table)
  - Serious ROP rare before postmenstrual age 31 weeks, so this is the youngest age that requires screening

How Often?
- A single screening exam is sufficient if the retina is fully vascularized OU
- Otherwise, 1 - 3 week follow-up is indicated (depending upon exam findings)
**Long-term follow-up**: A child with ROP needs periodic follow-up beyond the newborn period because...

- Vitreoretinal traction can lead to RD in 1st or 2nd decade(s) of life.
● **Long-term follow-up**: A child with ROP needs periodic follow-up beyond the newborn period because…

  - **Vitreoretinal traction** can lead to RD in 1st or 2nd decade
**Long-term follow-up**: A child with ROP needs periodic follow-up beyond the newborn period because...

- **Vitreoretinal traction** can lead to RD in 1\(^{st}\) or 2\(^{nd}\) decade
- Amblyopia can result from refractive problem, macular pathology, and/or EOM problem
• **Long-term follow-up:** A child with ROP needs periodic follow-up beyond the newborn period because…
  - Vitreoretinal traction can lead to RD in 1\textsuperscript{st} or 2\textsuperscript{nd} decade
  - Amblyopia can result from high myopia, macular dragging, and/or strabismus
- **Long-term follow-up**: A child with ROP needs periodic follow-up beyond the newborn period because...
  - **Vitreoretinal traction** can lead to RD in 1st or 2nd decade
  - Amblyopia can result from **high myopia**, macular dragging, and/or **strabismus**
  - Macular dragging can produce **pseudo EOM problem**
**Long-term follow-up**: A child with ROP needs periodic follow-up beyond the newborn period because...

- **Vitreoretinal traction** can lead to RD in 1st or 2nd decade
- Amblyopia can result from **high myopia**, macular **dragging**, and/or **strabismus**
  - Macular dragging can produce **pseudostrabismus**
**Long-term follow-up**: A child with ROP needs periodic follow-up beyond the newborn period because…

- **Vitreoretinal traction** can lead to RD in 1st or 2nd decade
- Amblyopia can result from **high myopia**, macular dragging, and/or **strabismus**
  - Macular dragging can produce **pseudostrabismus**
    - Will have positive **angle kappa**, but no **shift on cover testing**
**Long-term follow-up**: A child with ROP needs periodic follow-up beyond the newborn period because...

- **Vitreoretinal traction** can lead to RD in 1st or 2nd decade
- Amblyopia can result from **high myopia**, macular dragging, and/or **strabismus**
  - Macular dragging can produce **pseudostrabismus**
    - Will have positive **angle kappa**, but no **shift** on **cover testing**