

# KRANİYAL BİLGİSAYARLI TOMOGRAFİ (BT) YORUMLAMA VE KULLANIM İLKELERİ

Aslı Bahar UÇAR<sup>1</sup>

## 1. GİRİŞ

Bilgisayarlı tomografi (BT), acil tıpta en sık kullanılan ve hayatı tehdit eden durumların tanısında zaman kazandıran görüntüleme yöntemlerinden biridir. Kraniyal BT, başta kafa travması, şuur değişikliği, fokal nörolojik defisitler ve inme gibi durumlar olmak üzere pek çok acil klinik tabloda ilk basamak görüntüleme aracıdır. Hızlı uygulanabilirliği ve yaygın erişilebilirliği sayesinde acil servisler için vazgeçilmezdir.

## 2. KRANİYAL BİLGİSAYARLI TOMOGRAFİ'NİN TEMELLER

1973 yılında Godfrey N. Hounsfield ve Allan M. Cormack tarafından geliştirilen BT [1], tıpta devrim niteliğinde bir görüntüleme yöntemi olarak 1979 yılında Nobel Ödülü'ne layık görülmüştür. BT'nin prensibi, farklı dansitelerdeki dokuların X-ışınlarını farklı oranlarda emmesi esasına dayanır. Günümüzde kullanılan çok kesitli BT sistemleri [1,2], çoklu X-ray tüpleri ve dedektör dizilimleri sayesinde aksiyel, koronal, sagittal ve üç boyutlu (3D) görüntüler elde edebilme olanağı sunmaktadır. Bu sistemlerde, aksiyel düzlemde elde edilen ham veriler yazılım aracılığıyla işlenerek koronal ve sagittal düzlemlere dönüştürülür; bu işleme multiplanar rekonstrüksiyon (MPR) adı verilir. MPR verileri, damarları belirginleştiren MIP (Maximum Intensity Projection – Maksimum İntensite Projeksiyonu) ve hacimsel 3D görüntüleme VR (Volume Rendering – Hacimsel Rekonstrüksiyon) teknikleriyle birleştirilerek vasküler yapılar daha ayrıntılı değerlendirilebilir.

Tek bir kraniyal BT'nin ortalama etkin radyasyon dozu [3], **yaklaşık 2–4 mSv**'dir. Karşılaştırma yapmak gerekirse, bir bireyin yıllık doğal arka plan radyasyon maruziyeti ortalama **≈ 3 mSv** olarak kabul edilmektedir. Çocuklarda radyasyona bağlı **kanser gelişme riski** [4] **yetişkinlere göre 2-3 kat daha yüksektir**; bu risk özellikle **yüksek dozlarda** ve

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*MR daha duyarlıdır; BT'nin sınırlılıkları göz önünde bulundurulmalıdır [1].*

- **Radyasyon güvenliği:** Gereksiz tetkiklerden kaçınılmalı, özellikle pediatrik ve genç erişkin hastalarda “as low as reasonably achievable (ALARA)” prensibi gözetilmelidir [6].

### Etik Bildirim

Bazı görseller (Resim 4 ve Resim 5) yapay zekâ desteğiyle (OpenAI GPT-4) oluşturulmuştur. Bu görseller yalnızca eğitim ve anlatım amacıyla kullanılmış olup, gerçek hastalara ait değildir.

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## RESİM KAYNAKLARI

- Resim 4.** Kraniyal Bilgisayarlı Tomografide aksiyel görüntüleme düzlemi ve standart oryantasyon görünümü. Yapay zekâ destekli olarak oluşturulan temsili görüntü (OpenAI. GPT-4. San Francisco (CA): OpenAI; 2023. Available from: <https://openai.com/gpt-4>)
- Resim 5.** Aksiyel, koronal ve sagittal düzlemlerde kraniyal Bilgisayarlı Tomografi kesitlerinin karşılaştırmalı görünümü. Yapay zekâ destekli olarak oluşturulan temsili görüntü (OpenAI. GPT-4. San Francisco (CA): OpenAI; 2023. Available from: <https://openai.com/gpt-4>)
- Resim 7.** Hareket artefaktı Koronal BT görünümü- Case courtesy of David Cuete, Radiopaedia.org, rID: 25637 (Accessed on 08 Sep 2025) <https://doi.org/10.53347/rID-25637>
- Resim 8.** Aksiyel BT, Kurşunlanma vakası yabancı cisime bağlı çizgisel artefakt- Case courtesy of David Cuete, Puyó Vera D Radiopaedia.org, rID: 28087 (Accessed on 08 Sep 2025) <https://doi.org/10.53347/rID-28087>
- Resim 24.** BT aksiyel kesitte sol temporal lobda, merkezi hipodensite içeren halkasal morfolojide bir lezyon- Case courtesy of Frank Gaillard, Radiopaedia.org, rID: 6022 (Accessed on 08 Sep 2025) <https://doi.org/10.53347/rID-6022>
- Resim 25.** Global beyin ödemi 25 yaş motosiklet kazası, aksiyel Bilgisayarlı Tomografi görünümü- Case courtesy of Ayaz Hidayatov, Radiopaedia.org, rID: 55446 (Accessed on 08 Sep 2025) <https://doi.org/10.53347/rID-55446>
- Diğer resimler, yazarın klinik arşivinden alınmış olup, etik kurallara uygun şekilde anonimleştirilmiştir.