PEDİATRİDE İYONİZAN RADYASYON RİSKLERİ ve KORUNMA

Yazar
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Ufkumu aydınlatan sevgili torunlarım Nehir, Yiğit ile aramıza yeni katılan Can ve ufuktaki diğer kuşaklarıma !

SUNUŞ

Hastalıkların teşhis ve takibi için gerekli olan ve gelişen teknoloji ile artan çeşitlilikte tıbbi görüntüleme yöntemleri toplumun giderek daha fazla radyasyon almasına neden olmaktadır. Keza gelişen teknoloji ile birlikte farklı radyasyon türleri ortaya çıkmakta ve buna bağlı olarak fiziki ortamdan aldığımız radyasyon miktarları giderek artmaktadır. Tanı araçlarının giderek artan teşhis etkinlikleri yanında hasta haklarının gündeme gelmesi nedeniyle "Hatalı tanı koyma" riskini önlemek için radyolojik tetkiklerin daha çok istenir olması, sağlık kurumlarında hastaların aldığı radyasyon miktarını yükseltmektedir. Bunun dışında radyasyonun başlıca kötü etkisi olan kanserojen özelliği ve risk sınırları konusundaki bilgiler de giderek artış göstermektedir.

Hamilelerde doğal ortamlardan veya tıbbi radyolojik tetkiklerle alınan radyasyonun fetus üzerinde olası etkileri konusu hekimlerimiz tarafından yeterince bilinmemektedir. Hamilelik döneminde yanlışlıkla uygulanan radyolojik tetkikler ve özellikle bilgisayarlı tomografi, fluoroskopik tetkikler fetusun oldukça yüksek değerde radyasyon almasına yol açabilmektedir. Bu tür radyasyonun doğacak bebekte ne gibi etkilere neden olabileceği konusu, bu konuda uzman olanlar tarafından dahi yeterince yeterince bilinmediği tarafımızca gözlenmiştir.

Bebekler ve çocuklarda radyasyonun önemi fazla olup bu grup hastalarda tıbbi iyonizan radyasyonun kanser oluşturma ve diğer yan etkileri daha yüksektir. Pediatri kliniklerinde tanı amaçlı görüntüleme gerektiğinde etkin ve duyarlı olan radyolojik tekniğin seçilmesi önemli olmakla birlikte radyasyonlu görüntüleme yöntemlerinin radyasyon boyutu ve biyolojik etkilerinin de gözönünde bulundurulması gerekir. Hasta olan bebek ve çocuklarda radyasyonsuz veya düşük radyasyonlu görüntüleme teknikleri ile etkin şekilde tanı konabilme olasılığı bütün klinisyenlerce giderek daha çok gözönünde bulundurulmaya başlanmış hatta başlıca amaç olmuştur.

Bu eserimizin başlıca amaçlarından birisi olanaklar ölçüsünde radyasyonlu görüntüleme tekniklerinin kısıtlı kullanılması gerektiği konusunda hekimlerimize yön vermektir. Buna uyarlı şekilde bebek ve çocukların radyolojik uygulamalarda ne kadar radyasyon aldıkları, bunların ne gibi kötü etkileri olabileceği ve risk oranları gibi konularda hekimlerin bilgilendirilmeleri sağlanmaya çalışılmış ve radyolojik tetkik isteminde bulunurken radyasyon boyutunun daima hatırda tutulması gereğine dikkat çekilmiştir. Özellikle radyolojik tetkiklerde başlıca radyasyon kaynağını oluşturan BT nin bebek ve çocuklarda oluşturduğu riskler ile az radyasyonlu BT görüntüleme tekniklerine de yer verilmiş ve önemi vurgulanmıştır.

Kitap içeriğinde radyasyonun fiziksel özellikleri, biyolojik etkiler ve ortam radyasyonuna da yer verilmiştir. Eser, çağdaş yayınlar ve araştırmalar ışığında hekimlerimize ve tıbbi radyasyonlu işlerde çalışanlara görüntüleme konusunda tanı ve tedavide yol göstermek, radyasyonun olası yan etkilerini hatırlatarak radyasyonun zararlı etkilerinden korunmak ve toplum sağlığına katkıda bulunmak amacı ile sunulmaktadır.

Kitabın hazırlanması sırasında elden geldiğince Türkçe kelimelerin kullanılmasına özen gösterilmiş ancak uluslararası tanımlar ve kelimeler ortak kullanım nedeniyle değiştirilmemiştir. Kitap içeriğinde istemeden ortaya çıkabilecek hataların hoş görülmesi dileğimizdir. Kitabımızın klinisyen ve radyasyon ile çalışan meslektaşlarımıza, dolaylı olarak da topluma yararlı olması en büyük amacımız olmuştur.

Dr. Ertuğrul Eğilmez

KİTAP KONUSUNDA

Bu eserin ana konusu bebek ve çocukların karşı karşıya kalabilecekleri her tipte radyasyonun risklerini tanımlamak ve korunma önlemleri konusunda hekimlerimizi ve insan sağlığı konusunda görev alanları bilgilendirmektir. Bu amaçla bebek ve çocuklarda gerek fiziki ortamlardan gerekse tıbbi görüntülemeler sırasında alınan radyasyondan korunma ve radyasyonun etkilerinin azaltılması için gerekebilecek önlemler konu edilmiştir. Bunun yanında düşük radyasyonlu ve etkin tıbbi görüntüleme teknikleri ile güvenilir şekilde tanıya gidilmesine katkı sağlamak için uygun görülen öneri ve yaklaşımlar sunulmaktadır.

Kitap içinde radyasyon değerleri konusunda dikkati çeken bazı farklı sonuçlar o konuda henüz fikir birliği oluşmamasına, farklı kaynaklarda gösterilen sonuçların yaklaşık- tahmini değerler olarak bildirilmesine veya başka nedenlere bağlı olabilir. Bununla birlikte kitap içeriğinde ifade edilen bilgiler ve radyasyon sınır dozları kitabın hazırlandığı tarihte uluslararası bilim dünyasında saptanmış, kabul edilen bulgu ve değerlerdir. Ancak bu bilgi ve sonuçlar gelecekte değişebilir.

Meslektaşlarımızın tıbbi teşhis ve tedavi için gerekli görüp isteyecekleri görüntüleme teknikleri konusunda hastalarına karşı sorumlulukları kendilerine aittir. Öte yandan bu bilgilerin sunulması ile bundan yararlananların karşılaşabilecekleri sorunlar konusunda taraf veya sorumlu olmadığımızı hatırlatırız. Kitapta sunulan seçenekler daha çok öneri, yönlendirme ve bilgilendirme niteliğindedir ve çağdaş tıp dünyasında kabul görmüş yayınlara dayanılarak hazırlanmıştır.

KISALTMALAR VE TEKNİK TERİMLER

Aberasyon (Kromozom)- Kromozom yapısında veya sayısında normal dışı sapma
ABD- Amerika Birleşik Devletleri
ACR(American Collage of Radiology)- Amerikan Radyoloji Koleji.
AJR(American Journal of Radiology)- Amerikan Radyoloji Dergisi.
BT- Bilgisayarlı tomografi
BTA- BT anjiyografi
EKG- Elektro-kardiyografi
Ekstrapolasyon- Bir dizideki değerlerden dizi dışındaki bilinmeyen değerlerin kestirimi. Belli bir dizinin bilinen sınır düzeylerinden, dizinin aralığı dışında kalan güven sınırlarının yaklaşık saptanması işlemi
ERR (Estimated Relative Risk) – Göreceli tahmin edilen risk miktarı.
FDA (Food and Drug Administration)- ABD de gıda ve çevre konularında görev yapan insan sağlığı denetim kurumu.
HVL (Half Value Layer)- Yarı değer tabakası– Bir maddeye giren radyasyon enerjisinin % 50 güç kaybı gösterdiği doku içi derinliği.
ICRP (International Committee of Radiation Protection)- Uluslar arası Radyasyon Korunma Komitesi
Ig- İmmun-globulin
Jul (Joule)- Termal, mekanik veya elektrik enerjilerini ifade eden birim.
Kolimasyon –X-ışın tübünden çıkan ışınların kısıtlanarak sınırlandırılması.
kV- kilovolt
mA- miliamper
mAs- miliamper saniye
MR- Manyetik rezonans
MRG- Manyetik rezonans görüntüleme
MRA- Manyetik rezonans anjiyografi
NCR- National Capital Region- Radyasyon Tesbit ve Uyarı Sistemi
NCRP- National Committee of Radiation Protection
NIEHS (National Institute of Environmental Health Sciences)- Ulusal Çevre Sağlığı Bilimleri Enstitüsü
NT- Nükleer tıp
OSCC- Oxford Survey of Childhood Cancers
PA- Postero-anterior
PET- Pozitron emisyon tomografi
PİTCH (Spiral BT tetkikinde kesit alma eğimi)- BT aygıtında tübü taşıyan halkanın 360 ° dönüşü sırasında masa hareketinin X- ışın demeti kalınlığına oranı. Bu değer arttıkça radyasyon dozu azalır.
PPI- Paternal Prekonsepsiyonel İrradiasyon
RF- Radyo-frekans
RN- Radyo-nükleid
RSNA (Radological Society of North America)- Kuzey Amerika Radyoloji Cemiyeti
SAR (Spesifik Absorption Rate)- Non-iyonizan radyasyon absorpsiyon birimi- Dokunun emdiği akım güç miktarı (Watt) nın organ kitlesine oranı.
SNR (Signal to noise ratio)-Sinyal- gürültü (sinyal-parazit) oranı – Herhangi bir noktada arzu edilen sinyal amplitüdü (boyutu) nün aynı noktada sinyal parazit amplitü-

düne oranı. Ekseri desibel olarak ifade edilir.
STUK- Finlandiya Nükleer Endüstri Kurumu
Translokasyon- Kromozom dizilim değişmesi
UNSCEAR- United Nations Scientific Committee of the Effects of Atomic Radiation- Birleşmiş Milletler Teşkilatı" na ait "Radyasyon Atomik Etkileri" konusunda görevli kurum.
US- Ultrason
Wr (Weighted radiation)- Radyasyon ağırlık faktörü- Radyasyon etki farklılığı açısından dokusal etki katsayısı. Kalite faktörü (Quality Factor- QF) olarak da isimlendirilmektedir.

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